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THE ARCHITECTURAL REVIEW

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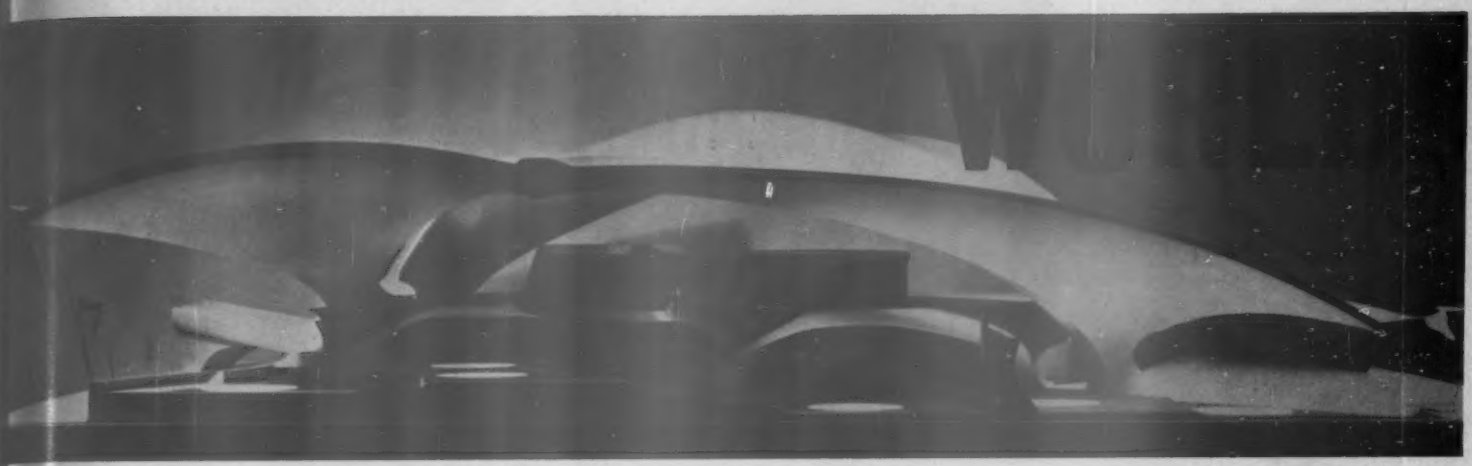

1

CONCRETE BIRD: *progress at Idlewild*

Much shoulder-shrugging greeted the Saarinen project for the TWA terminal at Idlewild—no one doubted that something like that could be put up, but most expected some heavy modifications along the road, forgetting that there is practically nothing that a sane architect can dream up that US building technology can't produce if the client will foot the bill. The latest version, 1, of the Idlewild model shows few consequential changes to the original design, while progress shots, 2, showed that it could indeed be built—or, at least, the form-work. However, it is clear that work has now passed the point of no return and, in a few months, we should have some idea how the finished building is going to look. In the meantime, the bare shell looks so like one of Roszak's sculptures, with its straddling eagle-legs, 3, that it fully justifies the appellation "Eero's Bird."

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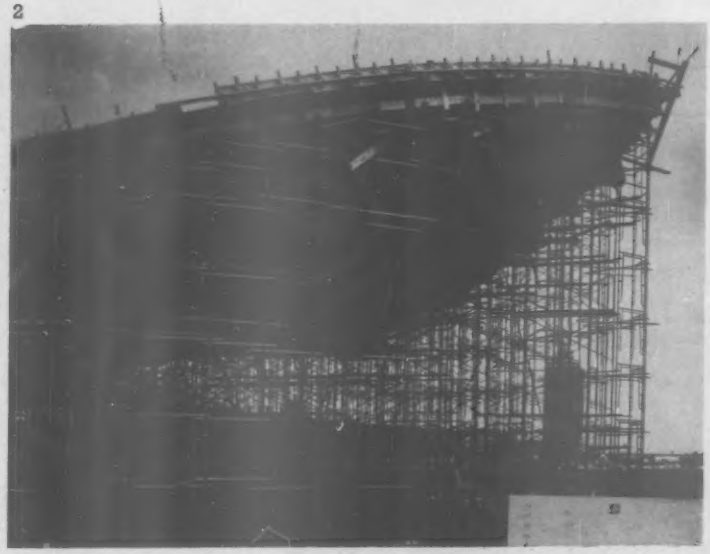

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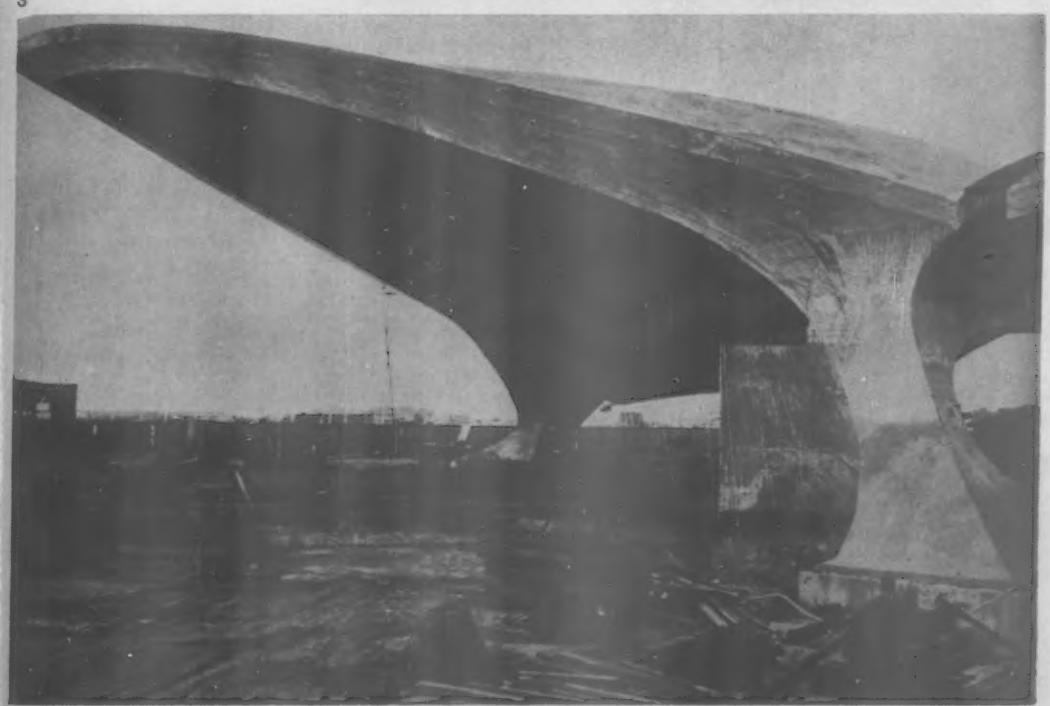

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HASSI MESSAOUD

Saharan Pipeline Control Tower

With some 1,512 possible combinations of piped connections between twelve storage tanks and three or four tankers being loaded, the ocean terminal of the Sahara oil pipe line at Hassi Messaoud is a sort of topological nightmare that probably could not be kept in order by the traditional technique of walking about from point to point opening and closing valves *in situ*. Instead, the whole installation is tele-commanded from a central control room on top of a tower, 4, at the visual focus of the whole scheme. Designed by Louis Allix, the tower consists of a cylindrical column containing the lift and services, capped by a two-storey control box, placed well off-centre on the column, 5, in order to leave as much of the interior space as possible as a single uninterrupted

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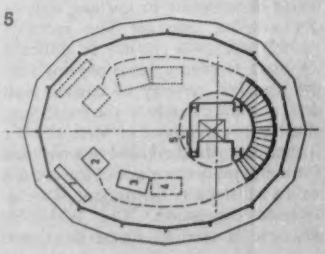

ACKNOWLEDGMENTS

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This month's cover—part of the elevation of an Australian student project for a library—is not to be dismissed as a juvenile extravaganza. A note on page 135 (which also illustrates another project from the same hand) reminds us that untrammelled imaginings of this sort can give timely warning of the ultimate destination of present trends in design.

6

Control Tower

room. The lower storey is for services, switchgear, relays and air-conditioning plant, while the upper floor contains the control consoles. The exterior, 6, is clad in aluminium faced panels with a high heat insulation performance: *l'Architecture Francaise* (No. 217-218) describes these as being ' à la manière des stations de pompage sahariennes dans l'Erg Orientale,' but to Anglo-Saxon eyes the whole thing has the air of the international technological style, and could equally well be at Cape Canaveral or Spadeadam.

HOUSE OF NUMBERS

Lottery Offices by Harald Deilmann

The *Zahlenlotto* seems to have become for parts of Germany what football pools are for the Anglo-Saxons, and so much business is now involved in the weekly pursuit of lucky numbers, that the Nordwest-Lotto has had to build itself a new headquarters in Münster. The building-type is, as far as is known, without precedent—as Anton Henze remarked in a splendidly dead-pan article in *Deutsche Bauzeitung* (10, 1960) 'The Italian *lotto* of the seventeenth and eighteenth centuries achieved no typical expression in Baroque architecture.' At Münster, Harald Deilmann (one of the collaborators on Münster's famous Stadttheater) was out on his own, but clearly

9

recognized that he was, in fact, dealing with an office-and-counting-house problem that had contemporary equivalents if no precedents.

His solution is a simple three-way breakdown into a block of work-halls (left in 9), an office-block (centre) and a services building (right). The forms are simple, the planning and some of the structural methods could almost come from a good English school building. The detailing of the walls and windows, 10, is superlative, as this corner of the work-block shows, and the purely functional interiors have a similar excellence—11 is one of the linking stair-corridors between the blocks. The immense counting-halls, 12, are roofed with a space-frame, 13, that will look very familiar to English eyes, though from the schools, not the Pools, and no pools promoter has yet

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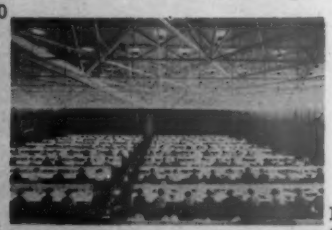

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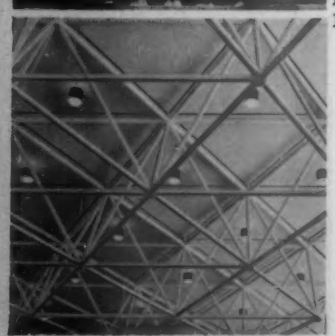

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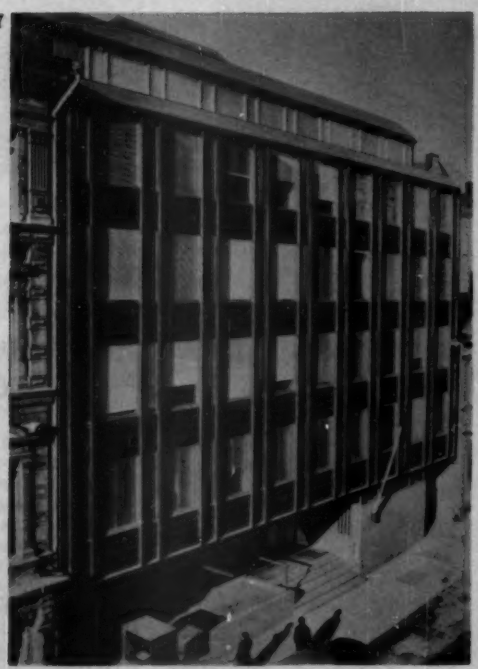
ANTI-MIES TELE-PHONE OFFICE



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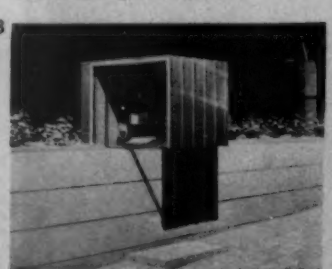
Helsinki seems to have been lucky in its telephone buildings: the first, built by the great Lars Sonck in the early nineteen-hundreds, was a masterpiece of northern Art-Nouveau almost comparable with Glasgow School of Art; the newest one, designed by Kurt Simberg, 7, is another distinguished addition to the growing repertoire of Baltic experiments in curtain walling (for another one see last month's *World*) which will one day be gathered up into a learned volume proving that the so-called poverty of curtain wall design is due entirely to the paralysing effect of the influence of Mies van der Rohe, and that architects exempted from that influence made of the curtain wall a satisfactory instrument of architectural expression. This particular example is used to clothe the fenestrated surfaces of a reinforced concrete frame down to the level of the first-floor slab; below that the façade is recessed, planted out with flowers and lawn, and provided with a neat piece of public relations, 8, a projecting acoustic hood which serves as a kind of minimum phone-booth.



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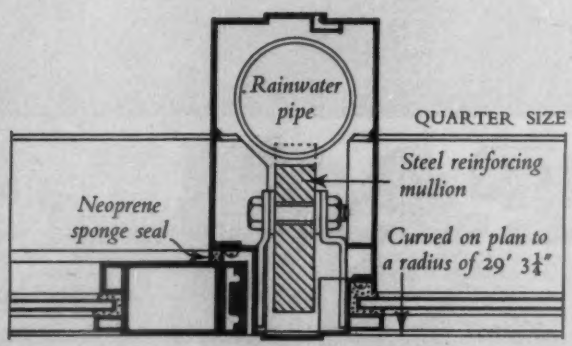

Section through an extruded aluminium mullion and door stile in the circular Conference Hall seen above.

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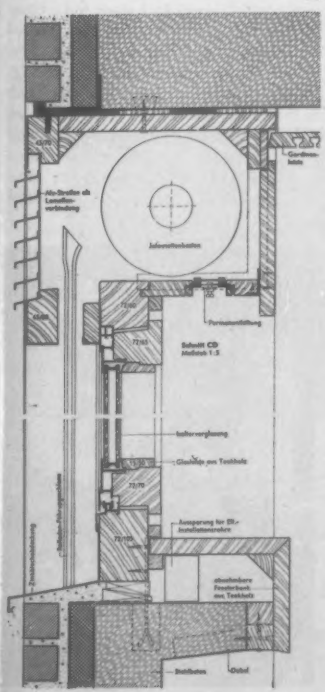
14

Nordwest-Lotto

commissioned for his front courtyard sculpture even remotely comparable with that by Bernard Heiliger, 14, outside the Nordwest-Lotto.

Puritan sentiment may well regret that talents as conspicuous as those of Deilmann should be 'wasted' on a function such as this, but the same Puritan sentiment should feel satisfaction that in a situation where there were clear temptations to overdesign irresponsibly or underdesign hypocritically, the architect should have played it straight and preferred to give a very convincing demonstration that 'the architecture is in the details'—details that even German magazines are picking over with obvious satisfaction; 15 is a section of one of the windows, complete with double-glazing, blind-roller, ventilation by way of external aluminium louvres and a breather-strip in the window-head, and a duct for electric conduits under the inner cill.

15



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UMBRELLA HOUSE by ULRICH FRANZEN

One of the curiosities of architecture to-day is the inability of even the most brilliant architects to generalize a particular structural technique into a convincing hold-all style such as was achieved in pre-technological architecture. About Perret, Mies, Buckminster Fuller there has been raised the objection, less or more justified, that they were forcing too-various functions into too-similar structures. Discussion of the work of such men is usually too heavily loaded with partisanship and breathlessness in the presence of genius to produce useful answers, and it is a relief, therefore, to be able to turn to a less well-known architect, a designer of quality who has set himself this same problem.

Ulrich Franzen's house at Essex, Connecticut, 16, utilizes—near enough

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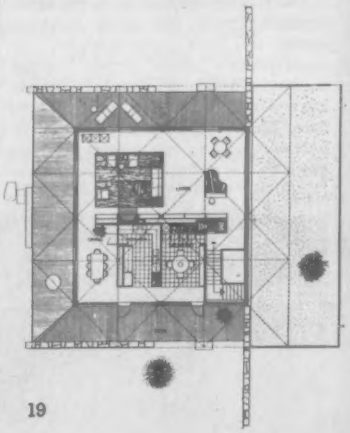

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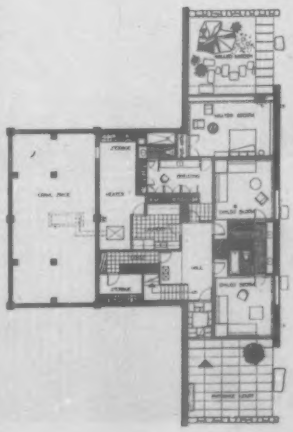

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—the same construction as his garment factory near New York, which was illustrated in *World*, AR July, 1959. That is to say, stanchions carry inverted umbrella forms fabricated in steel, planked-in on the underside. The visible geometry, 17, is not immediately seen to be simpler than a vault form, but these are not warping surfaces—the word 'umbrella' is not lightly used and the resulting inverted pyramids are formed over a frame that is, indeed, very like. The space contained under the nine umbrellas is glazed at the line of the outer stanchions, and is really one large continuous living room with functional subdivisions. The non-living-room functions are dealt with at a lower level, with a spread of bedrooms, 18, housed in a sub-structure in front of a retaining wall, and service rooms behind, partly excavated into the hillside; see plans 19, 20.

In other words, the non-conformable accommodation has been dealt with outside the particular aesthetic/structural complex that gives the house its character. This *may* be avoiding the issue, but if it is, then Philip Johnson has done almost the same thing in his Wiley House (with extensive justificatory observations) and Mies did it, effectively, in the Tugendhat house thirty years ago. But there clearly remains an unresolved problem here in the aesthetics of structure.

Danish Elegance

21

1: WASHINGTON EMBASSY

Opened with a characteristic lack of fuss as long ago as October, and surprisingly ignored by most of the press since, the new Danish Embassy in Washington, 21, takes back to the US that businesslike embassy style more or less invented *in* Denmark, by the US State department (i.e., Ralph Rapson's work in Copenhagen) and subsequently forgotten by the US all over the world. Designed by Vilhelm Lauritzen, the new embassy makes a simple division of functions into two separate 'pavilions' with the ambassador's residence at the right in 21, and office accommodation to the left, with a further private apartment at the extreme end of this block, reached by the entrance beyond the wall in 22. The interior is largely designed by Finn Juhl, and equipped partly with purpose-designed furniture by himself, partly by the architect—e.g., the chandeliers in the ambassador's library,

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23—but largely with production-run furniture by various Danish hands, for which the embassy's press-agents, if not the ambassador, appear to regard the building as a shop window.

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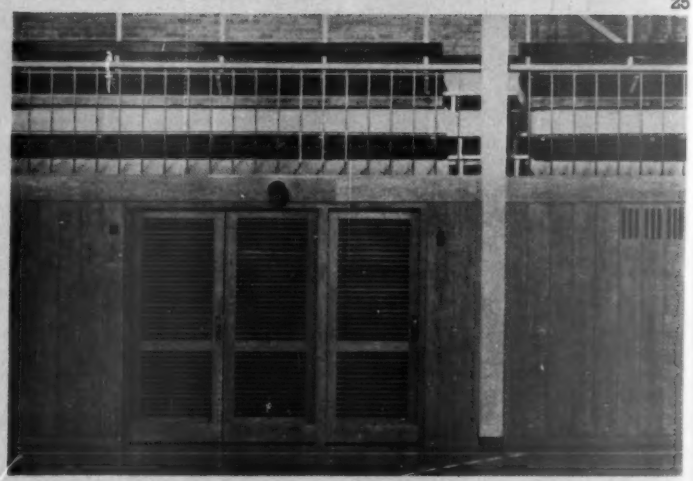
2: VORREVANG SCHOOL



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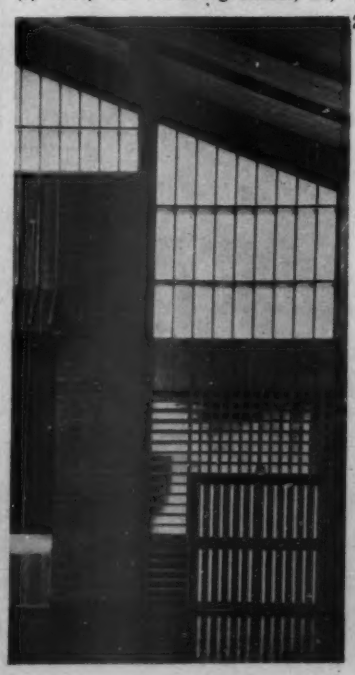
The present dominance of machine-aesthetic figures like Arne Jacobsen seems to have overshadowed his countrymen's more firmly rooted ability to design well in their 'native' materials of brick and wood. These basic Danish abilities are powerfully brought back to our attention, however, by the publication in *Arkitektur* (5, 1960) of Vorrevang school, 24, designed by the City Architects' Department of Aarhus. The exteriors are unremarkable because the design has been deliberately kept low and ground-hugging to follow the character of the surrounding housing in Vorrevang, but the interiors are noteworthy for the elegant simplicity of the way in which brick walling and screens or windows of wood and glass have been put together. The assembly hall, 25 and 26, shows this ability most forcefully, as well as the excellent wood detailing, and in some of the teaching spaces, such as the music room, 27, it achieves an almost Aalto-esque quality, albeit starting out from basic propositions that must be the almost exact antithesis of Aalto's craggy monumentality in the same materials.



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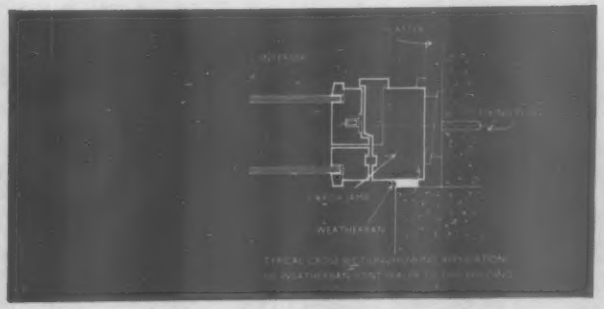

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MARGINALIA

CIVIC TRUST REPORT

By waiting until the end of its third year of operations before making a public report, the Civic Trust has been able to produce a document that covers its activities from its first inception to its first major triumph—the rejection of the Cotton scheme for the Monico site. But, as the *Report* implies more than once, London is in many ways the least of its problems, and the prevention of outrage requires eternal vigilance all over the country. Appropriately, therefore, most of the illustrations deal with the Norwich and Burslem 'face-lifting' operations, and with the fieldwork done in clearing derelict military establishments from the countryside.

Justifiably, the Trust looks back over these three years as years of success in making an impact on the public conscience and in giving local amenity societies a national head and front—important this because the CPRE cannot properly deal with civic outrage, so that the fight against urban spoliation has lacked a central body until the Trust was formed. But the register of amenity societies published in the back of the *Report* does not make altogether encouraging reading. They are thickest on the ground in Surrey, where there are thirty, but Middlesex has only nine, and areas in the marginal land around industrial conurbations in the Midlands and North, where the fighting must needs be toughest, are desperately thinly represented—Warwickshire has only seven, Lanark only one.

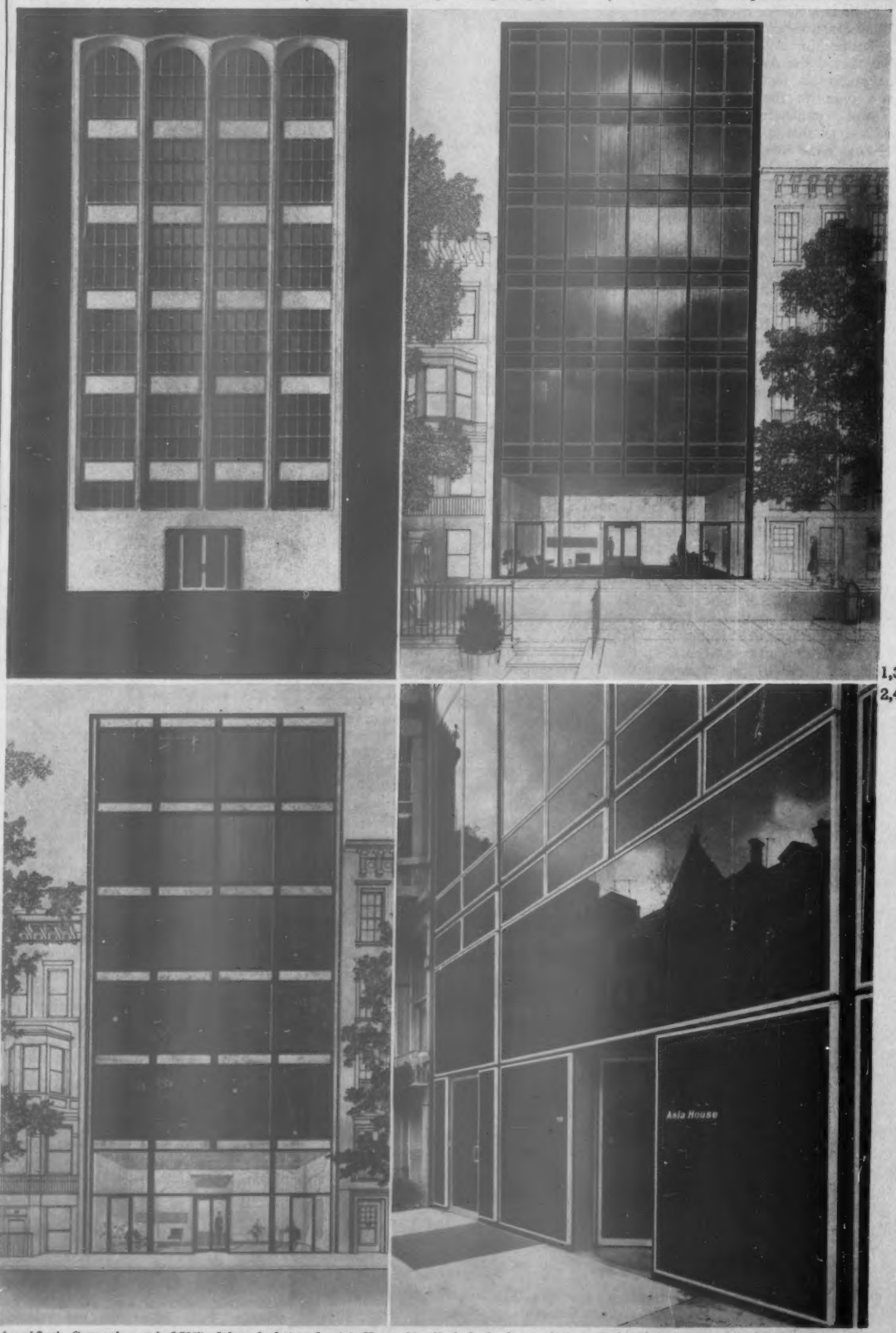
Clearly, it will not be enough to give comfort and aid to the amenity societies that exist; the Civic Trust, to make its voice effective, will probably have to go out and *make* amenity societies where they are needed. As the *Report* says, outrage will not be prevented 'from an office in London. It is the responsibility of vigilant citizens on the spot to sound the alarm.' But those citizens will need a fighting organization on the spot, through which the Trust's assistance can be channelled, and through which the diffuse public interest stirred up by the Trust's use of TV and other media, can be directed where it will do most good. One hopes to read in the next *Report*, not only that 'It has given support to amenity societies all over the country,' but also that it has helped to bring new societies into being.

ALTERNATIVE ELEVATIONS

Philip Johnson's admiration for Sir John Soane is a matter of historical record, but it has not so far been noted as going beyond an admiration for Soane's formal procedures. We cannot be sure, therefore, that he was emulating Sir John's *Alternative Proposals for Commissioners' Churches* when he produced three different designs for the facade of Asia House in New York. The designs have, in any case, an intrinsic interest of their own, comprising one in what his detractors would probably term his *Ballet School* manner, 1, though more thoughtful investigation would probably suggest comparisons with late nineteenth-century office buildings (such as Louis Sullivan's Condict Building) while the other two are variations on a known Johnsonian theme, the glazed urban facade, one of them realized in huge single panes and simple spandrels, 2; the other in smaller units, 3, and this was the version that was built. The fine sparse detailing of the last, as built, 4, should give the lie to those who seem to think that US architects, overcome by their affluent society, can no longer do a simple thing simply.

THE FUTURE OF WINE STREET

The continuing variance between organized architectural opinion in Bristol (represented by the Bristol Architects' Forum and the Royal West of England Academy) and the City Council is an interesting microcosm of larger scale conflicts on planning matters. The Council may well take note that while the RWA scheme for the redevelopment of Hotwells



1,3
2,4

1 and 2, the first and second of Philip Johnson's designs for Asia House, New York. 3, the design which was built and, 4, close-up of the finished building.

provided for the possibility of land subsidence in advance, their own apparently did not and now threatens the stability of buildings higher up the slope which it was intended to preserve. Having taken note that they were here misinformed on a matter of foreseeable fact, one hopes that they may entertain the possibility that they may be in a similar situation over the Wine Street development.

The position over Wine Street, which has stirred the Architects' Forum to action, is this. In the immediate post-war plan for the rebuilding of the almost completely blitzed centre of Bristol, an area of just over four acres around Wine Street was scheduled for public buildings—in intention, a cultural centre—and compulsorily purchased. Since then it has been one of the ugliest car-parks in England, a real urban ulcer, while the cultural heart of the city has quietly, but inexorably, slipped away up the hill to the fringe of the University area.

Since 1958, however, two plots of land in this area have been leased (or, more precisely, optioned) for non-cultural, non-public-building use—one to the Bank of England, one to the Norwich Union for office buildings which have been designed already, it is believed. The Architects' Forum has justifiably objected to these operations on the grounds (*a*) of a lack of candour on the part of the Council in not disclosing a change of intention, nor applying for an amendment to the development plan; (*b*) that no alternative comprehensive development scheme has been produced so far; (*c*) the area is part of the ancient centre of the city and is held in high esteem by Bristolians, so that its future is a matter of direct public interest, and not to be settled piecemeal behind the citizens' backs. In spite of protests, the town planning committee has now approved the Bank of England and Norwich Union schemes, and embattled citizens are now driven back to their last ditch, to demand a Ministerial enquiry, Monico-style.

The purely political rights and wrongs of the case look clear enough, though they will doubtless be disputed, but far more important is the matter of principle involved: that an opportunity to give a much-wounded city a new and worthy heart (even a worthy *commercial* heart, if need be) is being allowed to crumble away for lack of forethought and resolution.

CORRESPONDENCE

CAMBRIDGE NEW TOWN

To the Editors.

SIRS,—May I draw your readers' attention to a scheme that brings sharply into focus the problem of urban renewal in Cambridge? At a recent public enquiry the Cambridge Corporation sought confirmation of a Compulsory Purchase Order for part of an area formerly known as New Town. Built about 160 years ago, the district is half a mile from the centre of the city and lies between Hills Road and Trumpington Road. To the north is the Roman Catholic church and the new University chemistry laboratories on Lensfield Road. Three streets away on the south are the Botanical Gardens and on the west is Brookside, the Leys School and the ample spaces of Trumpington Road.

New Town is a close-knit area where houses, shops, garages, church hall, school and builder's yard lie intermingled as they have grown up. To walk along its streets (almost all of which are called 'Street') is to experience a real sense of place. It is urban—a town—as none of the city's new estates on the outskirts can ever be. It is the Cambridge vernacular. In the 'better' parts of New Town, e.g. Panton Street, the prices at which terrace houses in poor condition have changed hands recently reflect the keen demand for a place to live near the centre and, dare one hope, a demand for something more civilized than the average current housing estate. Some houses in the clearance area itself are of the same kind.

At the enquiry the Corporation revealed it had no plans whatever for the area and would not make plans before the Order was confirmed. The zoning is for residential use and it would be developed for housing, but beyond that nothing had even been considered. The Corporation spoke of its duty to ensure urban renewal, but agreed that the redevelopment would be at a lower density. It made it plain that 'residential use' meant exactly what it said, and there would be nothing but houses or flats in the new development. No shops, no garage, and the one pub in the area must go.

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The New Town area of Cambridge, where wholesale demolition is threatened—see the accompanying letter: 6, typical terrace housing in Queen's Street. Some houses in this row are 'unfit,' but others are not. On the opposite side some are already boarded up. 7, there is no reason why houses of this sort should be bulldozed to give the Corporation a clear site for low-density rebuilding, with no problems. The demand for such centrally sited houses is high, and provided no threat of compulsory purchase hangs over them they will be well maintained. 8, the houses nearest to the camera are not classed as unfit—their owners have spent substantial sums on them. But they would be demolished with the rest for road widening although neither end of the street is to be acquired and so cannot be widened.

Such wholesale demolition would mean a sad loss to Cambridge. The ordinary residential areas which were built in the nineteenth century and before, all the central housing in the city—King Street, Orchard Street, Clarendon Street, Eden Street and New Town—are of a kind which few planning authorities, and fewer Public Health Inspectors, look at with favour. None of these streets of terrace houses is 'architecture' as civic authorities use the word, many of the buildings are admittedly in a bad state of repair and lack amenities, but few of them are slums of the kind which the Housing Act 1957 was intended to sweep away. Cambridge Corporation is dealing with real slums in the East Road area, but is now threatening to lose its sense of proportion and remove the very urban streets which give the city proper its character.

If the process goes unchecked, Cambridge in a few years will resemble a twentieth century New Town with the University in the middle of low density housing, car parks (if the Lion Yard plans are not rejected again), shopping precincts, and concrete lamp standards, all so insipid that one will prefer to live in Aberdeen, or even Oxford.

Yours etc.,

PETER HALE.

Cambridge.

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Following the Exploring Eye *feature on the* trulli *of Southern Italy (AR, December 1960) a correspondent has sent this photograph, 5, of a* trullo *church. It is set at the top of the main street of Alberobello, and forms the highest point in the village.*

BOOK REVIEWS

UNIQUE OPPORTUNITY

LONDON: THE UNIQUE CITY. *By Steen Eiler Rasmussen. Penguin Books. 5s.*

What Steen Eiler Rasmussen saw in the 1930's with the clear eyes of the foreign visitor was the essential Englishness of the London of that time, and in fact from very early times: opposite of all that was typical of the concentrated continental city—its scatter pattern—he then wrote, 'seems to many of us the ideal.' The timely re-issue of his work will bring it to the notice of a new wave of readers who may never have realised the uniqueness of London nor discovered its charm; it will perhaps be only just in time for them to explore the place as it is and recapture something of what it was from the remnants before these become submerged for ever. To a new generation of readers it may appear that the London which Rasmussen describes is an anachronism and in any case, less ideal than he thought it to be. Yet the principles which have motivated its evolution and unplanned growth might well be used now to guide its form in the future.

London set out to be unique from the very beginning. Whereas other towns have developed concentrically about the original nucleus, London reproduced itself by means of new settlements outside the walls so that the characteristic dispersion of Greater London originated far back in the Middle Ages. The author shows how from a very early date a more or less voluntary decentralization process was working in relation to the City; how Elizabeth I attempted to impose a density control; and how the characteristically English demand for public and private open space, together with an early habit of commuting, made horizontal growth an easy matter.

Rasmussen seemed fascinated by the idea that 'around every little village the buildings crystallized into a borough so that London became a greater and still greater accumulation of towns, an immense colony of dwellings where the people still live in their own houses in small communities, with local governments, just as they had done in the Middle Ages.' Such a conception may have seemed attractive when the book was first written, yet by 1945 John Summerson was referring to the girthless London of our own time whose boundaries were unknowable except as administrative hypotheses and whose sky-line was the bed of an ocean where the nineteenth century had foundered. It remains to be seen whether the new post-war sky-line will, in its turn, indicate the foundering of the twentieth century. Certainly by 1945 Barlow had pointed out the evils of scatter plus concentration, and Abercrombie, in preparing his own organized redispersal plan for the London Region had revealed the concentric growth rings that were smothering Rasmussen's ideal.

More and more the unique English city was taking on the characteristics

of the continental city where open spaces are few and land values high, not only in the centre but in the outskirts. London now enjoys the worst of both worlds: the scatter pattern which pushes the open country further away and high land values which increase congestion. It is, therefore, to say the least, perverse of the present Government to initiate a policy for consolidating congestion and increasing its range in the fond hope that this will lower land prices. Thus MoHLG Circular 37/60 requests higher densities to meet a housing demand which has always been at the root of the London problem.

It has, however, been estimated that some 4 million new homes will have to be provided in Britain in the next 20 years; but where? Pressures are all indicative of turning the south-east of England into a vast suburbia; making it a higher density suburbia will not solve anything. Somebody must now decide just what proportion of the population of the British Isles can be allowed to live in the London region and, secondly, the capacity of the region at reasonable standards. Only a slight rise in capacity, whilst contributing very little to the national demand, will create a disproportionate increase in congestion unless some entirely new pattern of development is arrived at. This would, of necessity, require a long-term solution and Circular 37, in suggesting that review plans should be re-aimed at 1981, does offer planning authorities the opportunity to provide one.

In a postscript to the Penguin edition of his book, Rasmussen remarks how our modern cities, with no clear limits, no climax, no single centre, though as different from old cities 'as a three volume novel from a sonnet' form the framework of our way of life. They are our cities and, he says, in the future they will be still more scattered; numbers of them will grow together to form strange arabesques all over the landscape.

An arabesque suggests something rather beautiful. To achieve anything like that from the present great wen will involve some drastic remodelling. But if London is to stay unique, some unique solution must be found for it. The separate places merged together in London should now have their identities re-established, and this could be commenced in the review plans without waiting for a Greater London Council to get under way with a regional plan. Higher densities could make a real contribution if, instead of being used as a political expedient, they were used as a planning tool to create real places. Only then would the Minister's 'fuller use of land within towns' begin to make environmental sense.

Raymond Spurrier

SITING ROADS

THE LANDSCAPE OF ROADS. *By Sylvia Crowe. Architectural Press.* 18*s.* 6*d.*

It is an interesting fact that the landscape control of an expenditure of over one hundred million pounds per annum in this country is done in committee and *in situ* by an advisory body to the Ministry of Transport, composed mainly of gifted laymen able to give perhaps one day a month to this work. It can be argued that in history there was no professional adviser and therefore none should be needed today. But there are two factors that combine to alter the situation beyond all possible doubt. The first is that the impact of that lethal weapon, the car, has itself nothing comparable in history (except only the chariot of scythes of Boadicea); and secondly the designer of the road is no longer an all-round man. The modern engineer is highly specialized and therefore conditioned to his subject, and his subject is the creation of roads that are functional and economic. The modern Brunel or Telford is rare, and the real problem does not lie so much in the immodesty of the engineer (who is personally no more immodest than any professional) as in the fact that he is wholly and totally unaware of what all this fuss over landscape is about.

Miss Crowe endeavours to illuminate the scene in her admirable book. If a busy engineer, already exhausted with dealing with too many personalities, were to say that he could spare two minutes and two minutes only in studying this work, then I should advise him to turn at once to the illustrations of the Preston By-pass on pages 72 and 73. Now the Preston By-pass was carried out conscientiously by the Highway Engineer, but the insensitivity of the design is apparent to all except those whose ideal is solely an efficient road. Then, we must enquire, what is efficiency? Is this streaky bacon really efficient to the dumb layman, or is it simply a soporific until he gets to the end of his journey? As we contemplate these two pages, we may well ask ourselves whether we would prefer to be inefficiently efficient,' or efficiently inefficient? In that question lies the problem of the technical age, and as one turns over the absorbingly interesting pages of Miss Crowe's book, there can in fact only be one answer. Indeed the previous page 70 shows two examples of considerable inefficiency, including scruffy walls, fences, spoil heaps, and so forth; yet I would lay a bet that there is more all-round satisfaction to be derived from this harmony of mechanical and animal man than in any of the roads that have been cleaned up and put into a strait-jacket. The point is that we can get much nearer than we are at the moment to the best of all possible worlds, and at no extra cost. This introduction to the study and design of roads should be read by laymen as well as technicians, and it should be read *now*, while the transformation of our country is actually taking place.

G. A. Jellicoe

COLONIAL VIRGINIA

PUBLIC BUILDINGS OF WILLIAMSBURG *By Marcus Whiffen, Colonial Williamsburg. (Distrib. by Holt, Rhinehart & Winston.)* $10.

Mr. Whiffen's *Public Buildings of Williamsburg* is the first volume in the proposed Williamsburg Architectural Study series. With his background in the field of English architectural history, Mr. Whiffen is well qualified to draw comparisons between it and colonial Virginia architecture. Therefore, it is of great importance that Mr. Whiffen should describe the buildings he is discussing as 'indubitably modern,' if not 'avant-garde.' These qualities are those, the author carefully points out, that were least desired by the master-builders of the eighteenth century. By his well-chosen comparisons he convincingly disproves the shop-worn theories of a cultural time-lag between the American colonies and the fashion centres of Europe.

By limiting his discussion to a small segment of colonial American architecture, Mr. Whiffen has left untouched one of its major problems—who designed the buildings? For the past two hundred years the great English seventeenth and eighteenth century architects from Inigo Jones to Sir Christopher Wren have been associated with various structures in the American colonies. While Mr. Whiffen discounts any direct participation by them, he does not completely eliminate the possibility. And just as the direct influence of architects cannot be proved, so the copying of designs from books or comparable structures in England is also open to question. In noting the quadrangular plan of William and Mary College, Mr. Whiffen does not pronounce it to be a copy of Chelsea Hospital, nor the even earlier quadrangular-planned Royal Hospital at Kilmainham in Ireland, known to have been designed by William Robinson. Instead it becomes obvious that all three buildings owe something to Bruant and Mansard's designs for the Invalides in Paris.

Perhaps one of the most important conclusions drawn from Mr. Whiffen's book is that the designs for these colonial buildings were prepared before funds were available for their construction. He proves conclusively that the designers were not only concerned with the aesthetic aspects of their buildings, but also possessed a keen concept of geometric subtleties and designed within the Palladian system of proportion. The mathematical basis of the designs of the Capitol and the Governor's Palace is shown clearly. In both buildings the principal dimensions were commensurable; those of the Capitol had integers of five and the Governor's Palace integers of six. Even the original building of William and Mary College was based on the Golden section, the double cube of Inigo Jones. From this concept one possibility becomes evident; one which might solve not only the problem of attribution of American buildings to English architects, but also the existence of buildings to already completed designs. That is—what was the role of the Board of Trade in the American colonies? Their influence cannot be underestimated, nor can the role of Inigo Jones and Sir Christopher Wren as public servants furnishing whatever designs were required by the government. We know that the Board of Trade provided the plans for at least one of the great houses of Philadelphia. Also, if the plans of Pennsbury, Hope Lodge or Stenton are examined carefully, one cannot fail to note their striking resemblance to the original plan of the Governor's Palace in Williamsburg.

Mr. Whiffen has devoted several pages to the influence of the Baroque on the planning of Williamsburg, citing as evidence the placement of the principal public buildings. It is surprising, therefore, that he has not observed that the relationship of the Capitol to the Governor's House is identical with that of the Palace of Versailles to the Grand Trianon. This is even more strange, since he mentions that the first volume of the *Description des Chateaux et Parcs de Versailles, de Trianon, et de Marly*, by Piganiol de la Force, published in Amsterdam in 1715, has been in the library of the College of William and Mary since the eighteenth century. It is not a coincidence that the Le Nôtre's formula was again repeated in America at the end of the eighteenth century in L'Enfant's design for the proposed Capital City at Washington.

In *Public Buildings of Williamsburg*, Marcus Whiffen has given only the briefest description of the restoration of these structures. Because of its size and importance, it is hoped that an additional volume in this series will reveal the philosophy which has given impetus and direction to the restoration of this colonial town. If the almost unlimited resources of the Rockefeller-endowed Colonial Williamsburg have been placed at the author's disposal, the reader is entitled to feel some disappointment at the physical appearance of this volume. This is true especially when compared to the superbly designed and printed monograph, *The Architectural Heritage of Newport, Rhode Island*, sponsored by the unendowed Preservation Society of Newport. However, one cannot be unimpressed by the vast amount of time and energy evidently expended by staff historians of Colonial Williamsburg to provide Mr. Whiffen the quantity of physical and historical documentation which adds so much to his descriptions of the various public buildings of this restored colonial town.

R. L. Raley

SPECIFICATION

SPECIFICATION 1961. *Editor: F. R. S. Yorke; Assistant Editor: Penelope Whiting. The Architectural Press.* 35*s.*

A large amount of well directed work has been done on Specification this year. Four sections have been completely re-written. The most significant perhaps is Peter Jay's re-writing of the Electrical Engineer section which is a model in the clear presentation of a relatively inaccessible subject. Other sections to receive a complete re-write are Roads and Footpaths, Plastics, and Thermal Insulation; and the rapid rate of change in proprietary products is reflected by such useful additions as John Sharp and Peter Whiteley's revisions of ironmongery and Peter Matthew's revision of suspended ceilings.

BOOKS RECEIVED

ADMIRALTY HOUSE. *By Viscount Cilcennin. Country Life.* 12*s.* 6*d.*

CONSTRUCTIONAL STEELWORK SIMPLY EXPLAINED. *4th ed. By Oscar Faber. Oxford Univ. Press.* 12*s.* 6*d.*

INNOVATIONS IN BUILDING MATERIALS. *By Marian Bowley. Chatto & Windus.* 70*s.*

TRADITION & CHANGE: A STUDY OF BANBURY. *By Margaret Stacey. Oxford Univ. Press.* 35*s.*

COMMUNITAS: WAYS OF LIVELIHOOD AND MEANS OF LIFE. *By Paul and Percival Goodman. Vintage Books, New York.* $1.25.

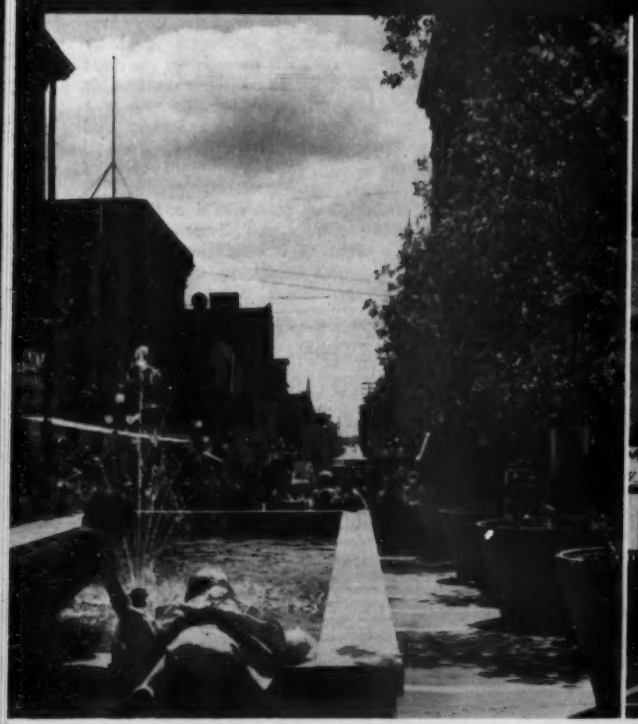
HUMAN ASPECTS OF REDEVELOPMENT. *By June Norris. Studies in Housing and Industrial Location No. 2. The Midlands New Towns Society.* 10*s.*

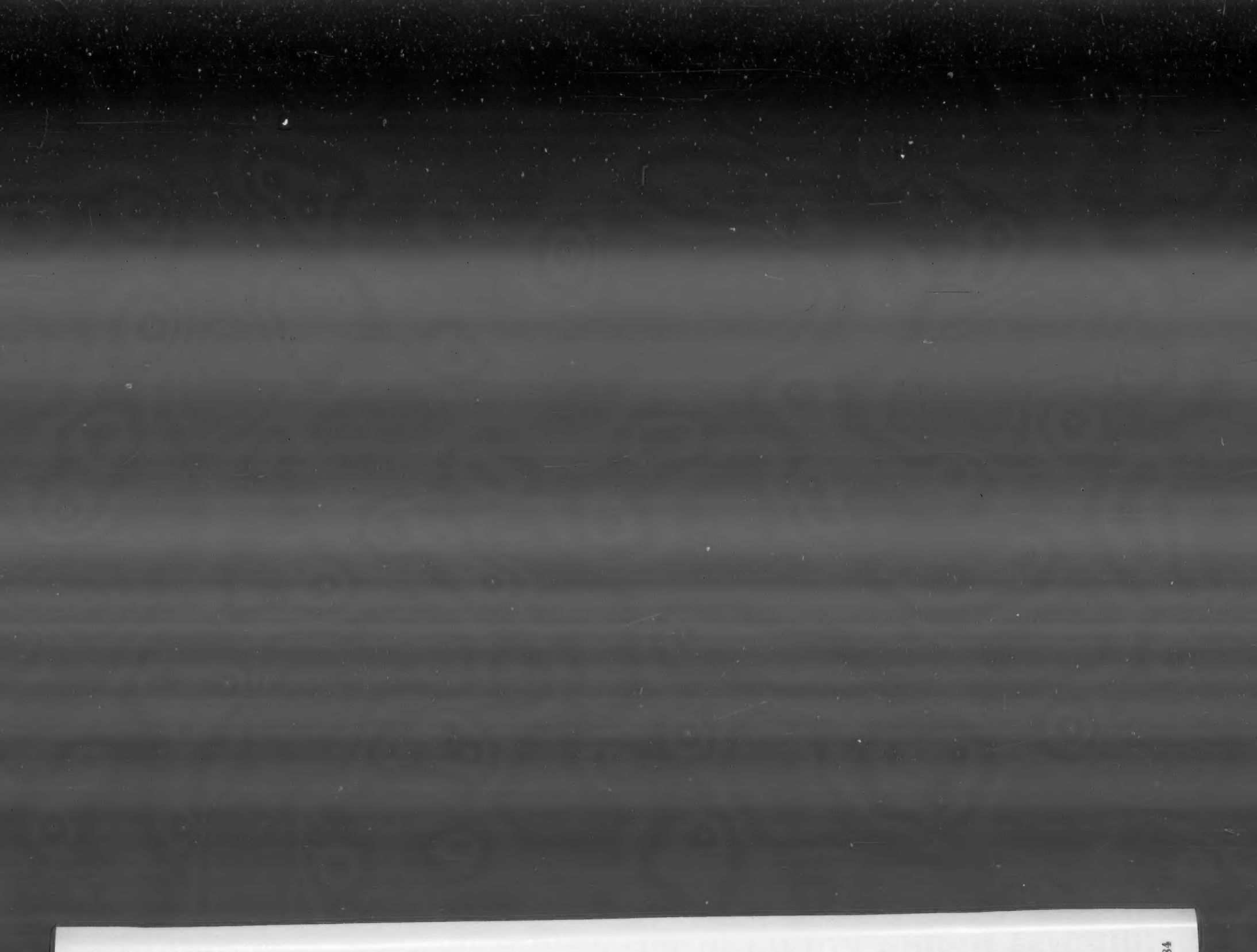
THE CHURCH AND THE ARTS. *Ed. Frank Glendenning. SCM Press.* 6*s.*

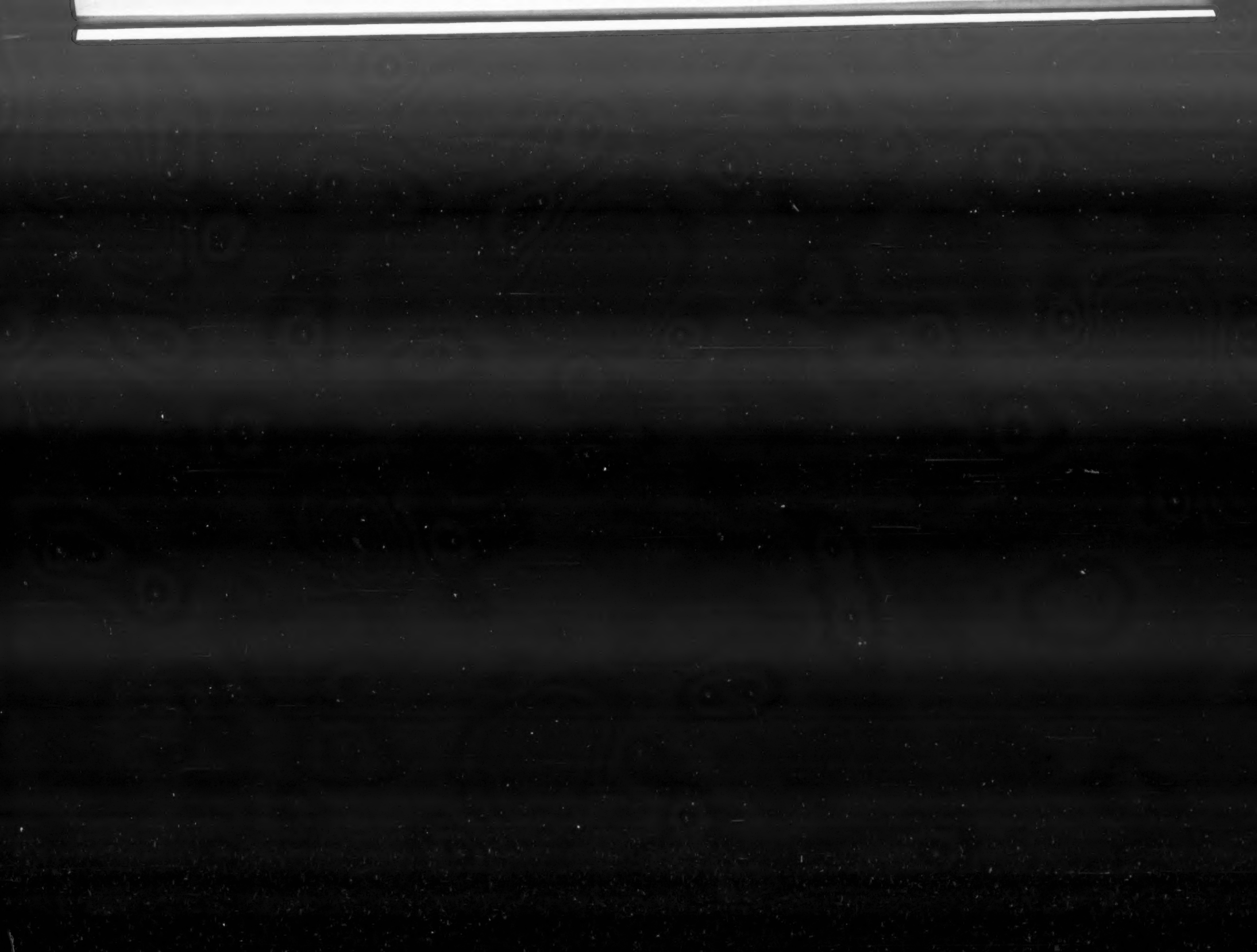
KOKOSCHKA. *Intro. and notes by Bernhard Borchert. Faber Gallery.* 15*s.*

INDUSTRIAL ARCHITECTURE. *By James F. Munce. F. W. Dodge Corporation.* $14.75.

British cities can learn from an experiment recently conducted in Ottawa, where a central shopping street, Sparks Street, above, was closed to wheeled traffic and transformed, below, into a pedestrian mall. Instead of being crowded on to narrow pavements and able to cross from one side to the other only when traffic was held up for them by police, the citizens of Ottawa were able, for a few months, to stroll about in comfort, enjoy the gardens and look at the shops. The transformation, though only temporary in the first place, may yet be made permanent. For further details see page 136.







Max Nicholson

SCIENCE INTO LANDSCAPE

THE URGENT TASKS OF THE NATURE CONSERVANCY

When the seventeenth-century painters launched their movement, culminating in Claude Lorraine, to show the world a new vision of landscape, blending man and his handiwork in a sublime and mysterious Nature, their message was nowhere more eagerly received and acted upon than in England. But the men who heard it were deeply rooted in country life, and also, under Baconian influence, were beginning to speculate and experiment in a scientific spirit about their material surroundings, and notably about agriculture, sylviculture, engineering and natural history in the broadest sense.

These were the men, of whom John Evelyn was a leader, who largely shaped the English landscape which we have taken for granted and now see vanishing before our eyes. Their aesthetic enthusiasm, and their care for what we now call amenity, was only a facet of an all-round experience of rural science and rural economics, and of both a day-to-day and long-term trustee responsibility for decisions on land use and land management. The modern schizophrenic system of splitting such responsibility (and even splitting the relevant knowledge) among separate often warring groups, neither knowing nor caring whether what looks good can pay its way, or whether what pays to-day is bankrupting to-morrow, would have struck them as crazy. The face which they put on England was lovely and lasting because its fine aesthetic taste was matched by deep and detailed knowledge of what would fit the local way of life and of earning a living, and of what would grow where.

When they planted hedgerows they provided shade for livestock, windbreaks to conserve moisture in herbage and soil, fences between fields for an age too backward to have invented barbed wire, cover for game and for animals valuable in controlling pests, and not infrequently also a modest source of fuel and raw materials for local crafts. When they dammed streams and created pools or small lakes they stocked them with fish and made them into favoured haunts of game and sources of water supply. The shapes and placing of their innumerable new woodlands were guided by a keen visual taste, but the choice of species and the sylvicultural methods were not divorced from considerations of ecological

fitness and economic increment. They naturally made plenty of mistakes but, considering how limited their science and technology were, they made a far more creditable attempt at discharging their trusteeship for the future than the twentieth century can claim.

Many hard and unpalatable tasks are urgent if we are to match, let alone excel, our ancestors. To begin with we must face the fact that the very existence, the character and the scale of the problem hardly begin to be understood even by people who regard themselves as educated and well-informed, and even by many of those who bear the highest responsibilities for the future of our land. It is an astonishing and almost incredible fact that no British university has yet a school of higher studies concerned with the fundamental problems of land and our trusteeship for it. While every step in the agricultural exploitation of land through crops or livestock is informed in detail by research into improved seeds, prevention of disease, nutrition, fertilizer requirements and innumerable other aspects, there is no systematic or significant research programme into our land capabilities and the factors bearing on wise use of land in view of the many conflicting claims upon it in this overcrowded country.

We do not know, and we have made no serious effort to work out, our national water budget over the next two decades, which may well show insolvency when we belatedly tackle it. There is not even any coherent set of principles, or any physical survey, governing the relationship of agricultural use to use for forestry. Unfortunately the British town and country planning movement, with all its achievements, has shared in this blind spot for the need of scientific research, except to some extent over geographical and social science aspects. Astonishingly few teachers or practitioners of planning have a scientific training or a scientist's approach to research requirements.

Just as architects in their training have access to the publicly preserved architectural treasures of the past, or designers can draw freely upon priceless national collections and many scholarly studies in the fine and applied arts, so there is a need for witness sections or living museums of landscape and all that underlies it, not only for conservation but for education, study and specialized research. Every gradation is to be found in Britain from the local and relatively inaccessible, utterly natural habitats and landscapes (such as the exposed summits of the Cairngorms, or the sub-oceanic offshore islets, or occasional relict woodlands which have survived on steep cliff faces or on islands in large deep lakes) to the entirely man-made and artificial habitat or landscape of an orchard, a Sitka spruce plantation or a sewage farm. Many of our favourite landscapes, such as the chalk grasslands of the Downs, the New Forest, the parks surrounding great country houses, or the banks of many rivers, are a thorough blend of both.

The Nature Conservancy, working under the Privy Council, have for the past ten years been selecting, acquiring, managing and beginning to study a comprehensive range of natural and semi-natural habitats which are given the legal status and relative inviolability of Crown Land through declaration as National Nature Reserves. There are now more than eighty of these, totalling around 140,000 acres, the greater part being in Scotland, since the more numerous Reserves in England and Wales are much less large. Certain types, such as off-shore islands, sand-dunes, salt-marshes, peat bogs, arctic-alpine Highland crags, slopes and plateaux, and sea-cliffs, are already tolerably well represented by examples showing the necessary range of different rainfalls and aspects, parent rocks and plant cover and so forth. Other types such as southern heathlands and grasslands are still very inadequately covered. To survey, negotiate for, safeguard and bring under the right management so many scattered sites is a time-consuming task, yet time is in short supply, and many irreplaceable sites may be lost if they are not acquired quickly.

One of the great handicaps here is the widespread lack of informed recognition and support for this indispensable permanent national collection of sites and habitats, and consequently of landscape. Many naturalists see such places simply as the haunt of one or two rare plants or animals, rather than as a whole, and until recently have been largely apathetic and ineffective towards their preservation, although the Council for Nature and Naturalists' Trusts are beginning to change this. Town and country planners, especially the officers of local planning authorities, have from the outset been most sympathetic and helpful in their attitude and actions, but the impression must be recorded that they have often done this more in the spirit of helping a good cause than of recognizing Nature Reserves and the research associated with them as vital tools for the long-term evolution of planning in terms of landscape. The need for ecological studies to underpin intelligent planning of land use has been much better understood and acted upon in other countries as various as Germany, the United States, Denmark and Israel.

How relevant research on Nature Reserves is to landscape planning can perhaps most immediately be shown by listing a few of the studies in progress. At Moor House Nature Reserve long-term experiments are running on the effects of commonly practised techniques of moor-burning and drainage upon water conservation and stream-flow, and consequently on liability to sudden floods and potentialities for evening out the flow of a river (in this case the Tees). Another experiment is testing the prospects of growing trees—any sort of trees—above the normal tree-limit on moorlands in order to provide cover for livestock and wild life and to help in restoring soil fertility which has been depleted by over-grazing and over-burning. Others are probing the possibilities of checking at the headwaters erosion which carries away soil and silts up rivers and reservoirs. Others, both at Moor House and in Snowdonia, are systematically checking the capacity of wild herbage to stand up to grazing pressure, especially by sheep, and are pointing towards improved methods of range management which might

lead to a richer vegetation and improving soils, at the same time carrying more grazing animals without reseeding. Others, notably at Gisburn Forest, are measuring the comparative productivity of different soils in terms of both coniferous and deciduous trees as against grazing. Others again are concerned with the conservation of soil moisture and the measurement of factors such as evaporation and transpiration, or the number of days with temperatures above the minimum necessary for plant growth at different altitudes.

All these, and many other studies, are cumulatively, although gradually, building up a reliable basis for determining just what are the practical alternative uses to which any given acre can successfully be put, and what are the implications in terms of biological dividend and the enhancement of biological capital. The various agricultural and pastoral uses normally considered are only some of such alternatives. Land may be better used for timber-growing, for sport, for flood control and water conservation, or in connection with tourism, to mention only a few which should be taken into account. Any sound zoning system for land use and any worth-while approach to long-term management, should replace current piecemeal and rule-of-thumb, hit-or-miss methods by a clear analysis of site factors and potentialities in terms of natural science and backed by valid experimental evidence.

Just as the agriculturalist needs results of seed trials or weight increments for livestock under different grazing systems, so the town and country planner needs access to ecological experiments which will show beyond question whether, and if so when and how, any given transfer of land from one use to another can be objectively justified. In this way, for example, the question of selecting sites which can be made available for building or other development with the minimum prejudice to all other interests, including agriculture, can for the first time be intelligently approached. At the same time, perhaps, a *modus vivendi* can be found regarding the logically absurd legal situation under which the planting with introduced conifers of thousands of acres of open moorland in a National Park is not a change in land use for the purposes of planning control.

Eventually, no doubt, local planning and National Park authorities will need a trained ecologist on their staff, as corresponding bodies abroad already have, and certain authorities here in Britain would like to if any were available. It is hoped that the post-graduate diploma course in conservation just started at University College, London, will help towards meeting the need for trained men. Under Sir William Holford the town planners in the College have shown keen interest in this course, which may prove a beginning towards more adequate university provision for land studies, and for bridging the gap between the natural sciences, geography and such applied schools as town planning, forestry and agriculture.

Researches and experiments on nature reserves can also do much to assist in day-to-day and operational problems affecting the landscape. For example in the Netherlands the corresponding department, which has been prominently concerned with the landscaping of reclaimed or reallocated land in the former Zuyderzee region and elsewhere, has been instrumental not only in settling on suitable native trees, shrubs and plants for highway, canal bank and other landscaping purposes, but has been able to ensure that adequate nursery stocks are available through trade channels which formerly, as in this country still, were heavily biased towards non-native stocks quite inappropriate outside towns and gardens.

By use of the volunteer Conservation Corps of the Council for Nature on long-term management experiments, techniques are being worked out for unobjectionably removing the large invasions of scrub woodland and thicket which have rendered so many commons and other open spaces useless for recreation or indeed any purpose. The expected legislation enabling common lands to be brought under management schemes in due course will increase very greatly the number of landscaping and land use problems of this type which will have to be faced in future on a more practical and scientific basis. Linked with this is the open space aspect and the whole problem of the impact of the public through excessive trampling of vulnerable sand-dunes, herbage or soils, chronic burning of heaths and woodlands, litter dumping, pollution and so forth. Many of our wild lands and waters are getting into a state which cannot be allowed to continue, but which needs study before it can be remedied.

It is on the Nature Reserves that a large part of the long-term research necessary to solve such problems must be undertaken, and some hundreds of projects, too often still too small, are already being conducted on them by the Nature Conservancy or by universities and other bodies. The Conservancy have not so far done much to advertise these studies until a good flow of results begins to come in, but the time is now near when much closer and fuller contact will be necessary and profitable between the ecologists and those concerned with landscape and planning. At the same time the national illiteracy on such matters will have to be massively attacked through the schools, television and broadcasting and other channels. Nothing less than a new attitude towards the shaping of a new landscape will meet the challenge.

In many cases Nature Reserves happen also to be national landscape treasures such as the Lyme Regis landslips and St. Kilda, or favourite places of public resort such as Old Winchester Hill, Cwm Idwal, Scolt Head Island and the Cairngorms. These last, covering some 40,000 acres, are probably the nearest approach in Britain to what would be considered in most countries a National Park, and (there being no National Park authorities in Scotland) the Conservancy assume responsibilities over shelters and footbridges for the use of wayfarers, while at Beinn Eighe in Ross-shire a camp site is provided. In such cases the Conservancy try to set a good example in design.

Such open space responsibilities are incidental to the Conservancy's functions, and are not always easily reconciled with the major needs of conservation and research. They go rather more easily with the educational functions which the Conservancy are gradually beginning to fulfil, as the growth of experience and resources permit. Eventually the role of Reserves as demonstration areas of problems and remedies may well match their importance as outdoor laboratories and living museums.

Much has been written in the *Review* and elsewhere about the social and architectural inadequacies of the suburban-style housing that comprises the greater part of the residential areas of the new towns—inadequacies shared by housing estates all over the country, but the more disappointing in the new towns because of the opportunities these presented for large-scale unified design related to a clear social programme. In the *Review* for September, 1960, it was shown* how some architects had managed, within the limits imposed by the conventional two- and three-storey house, to group such houses (often round pedestrian courts) so as to re-create some of the civilized and visually satisfying qualities of the traditional village. On the following pages a scheme is illustrated which carries these efforts still further by adding greater architectural distinction, a fresher use of shapes and materials and an unprecedented attention to the three-dimensional qualities of the whole scheme, especially in relation to the surrounding landscape.

This scheme is at Peterlee, the new town begun in 1948 in the coal-mining area of County Durham. Peterlee has had a chequered history and a succession of chief architects, the first of whom, Berthold Lubetkin, resigned when it became clear that local prejudices and political ineptitudes were going to frustrate the bold plans on which he was working. The main part of the town, as so far built, is dreary in the extreme; the faults common to most of the new towns are present without the redeeming features possessed by some. It was against the background of this disappointing result that the scheme illustrated here was conceived.

It began in 1955 when the general manager of the Peterlee Development Corporation, Mr. A. V. Williams, in an attempt to introduce some fresh ideas into the design of the town, conceived the idea of collaboration between the painter Victor Pasmore, who teaches at the neighbouring Newcastle University, and two young architects, Peter Daniel and Frank Dixon. Together they formed a design and planning team, working on an equal level and responsible to the general manager and chief architect.

They were allotted a 300-acre section of the new town called the South-West Area. This is separated from the rest of the town by unstable land which cannot be built on, and therefore, although it is within the area controlled by the master-plan, it is visually separated and could be conceived and planned as an independent entity. The design team's proposals for the development of the South-West Area were accepted by the Corporation in 1957, construction of the first 218 houses began in 1958 and a further 170 in 1959. These 388 houses form the first major section of the area, which is described and illustrated on the following pages.

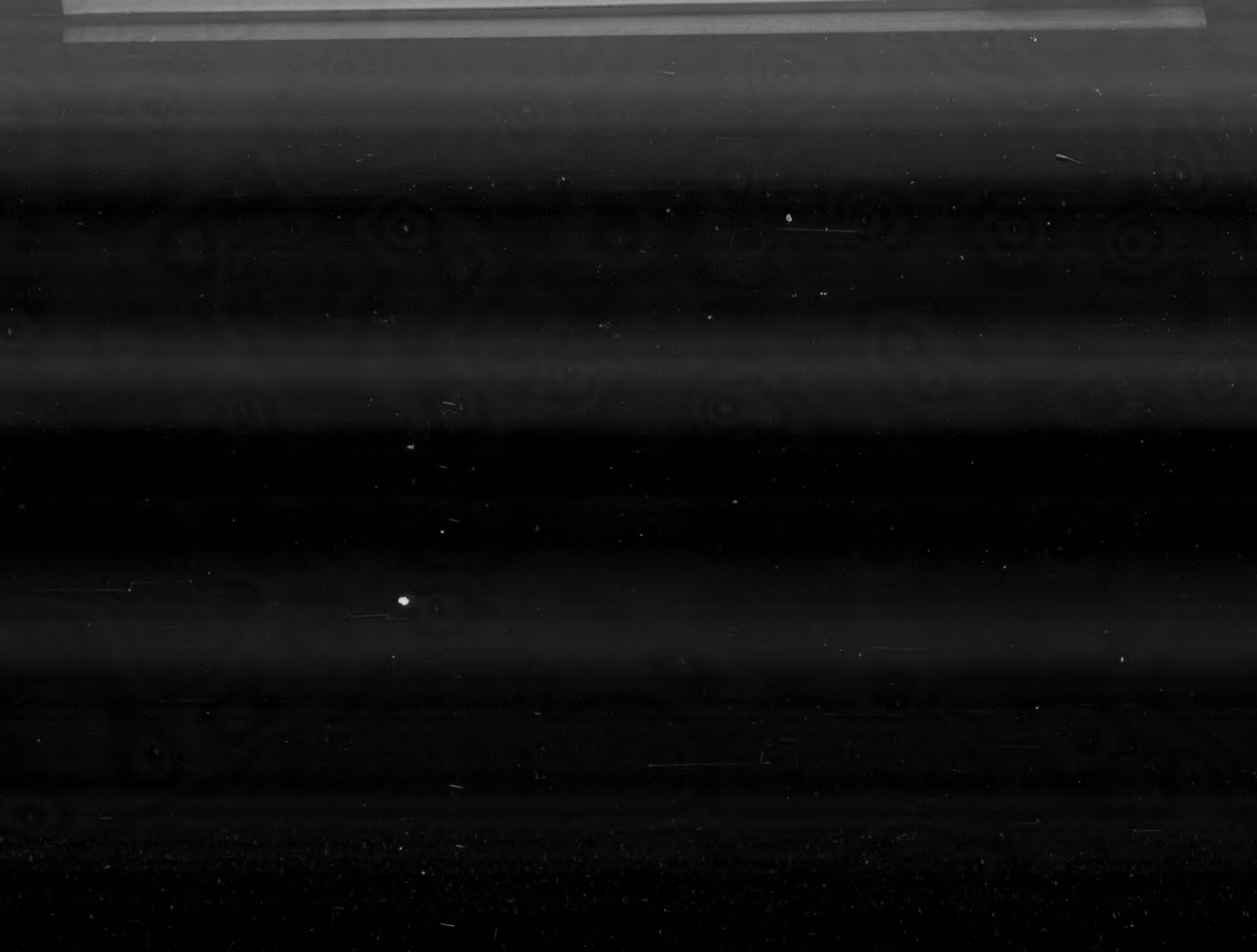
The photographs indicate the freshness of treatment and the nice balance of unity and variety that has been achieved in these houses; also their intricate but systematic grouping, providing usable outdoor pedestrian space yet preserving a compact and fully built-up character. Their mass effect contrasts sharply with the green landscape and has a positive visual relationship to it. The landscape, which remains completely rural, is one of free-flowing lines of hedgerows and tree plantations, and through it winds the Dene, a deep forested ravine, of unusual romantic beauty, widening to the sea.

The method of work of this three-man design team is of interest, especially in view of the inclusion of a painter. Painters are usually expected to collaborate with architects by incorporating their own works into the architectural whole. The Peterlee scheme exemplifies another and most fruitful form of collaboration: the exploitation, not simply of the painter's skill with a brush on a wall, but of his eye trained in manipulating colour and form and in appreciating their influence on one another; also his ability to imagine form in terms of aerial perspective.

The first housing layouts for the South-West Area were formed not on paper but by laying out scaled wooden blocks on a workshop floor. These blocks were followed by scale models, and the whole process of manipulating these blocks and models provided a common basis by means of which architects and painter were able to develop ideas together. From this process emerged the spatial arrangement of the houses, with their patio gardens, courtyards, parking squares and small open spaces, which distinguish them from the more conventionally laid out houses, lining roads and open squares in single depth, to be found elsewhere in Peterlee.

It should be added that the team was confronted—and at times frustrated—by two difficulties: the siting and construction generally, and the location of the occasional three-storey buildings, was determined by the need to allow for ground subsidence and surface movement caused by coal-mining beneath the site; and building prices—obtained by open tender—were not allowed to exceed those for traditional brick construction elsewhere in the new town.

*By means of recent housing schemes at Basildon and Harlow new towns and on the edge of Coventry.

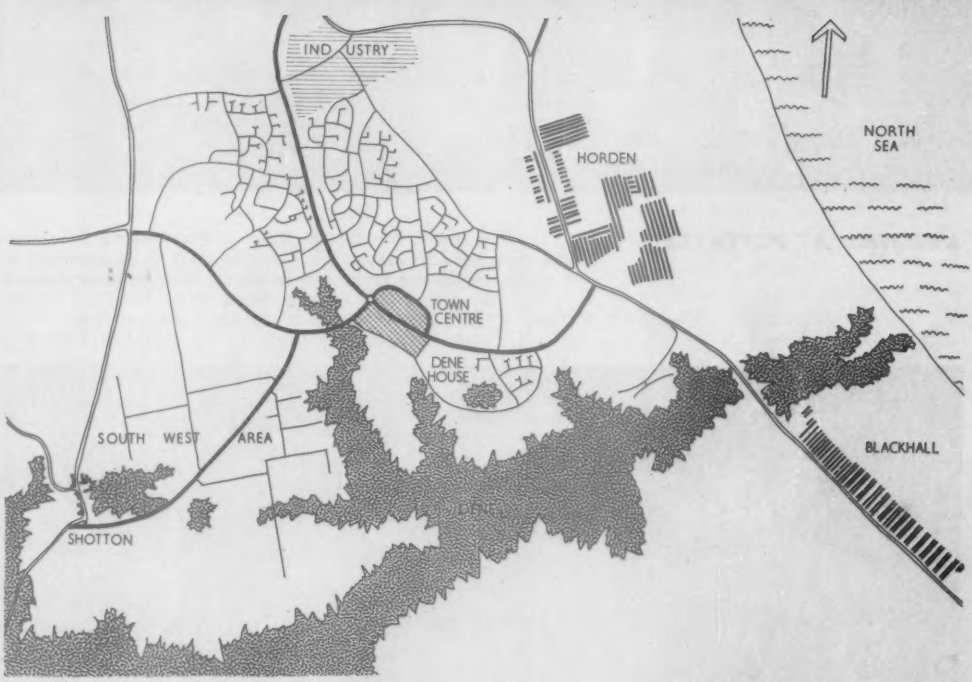


1

1 (right) is a distant view of some of the housing groups at Peterlee new town designed by the team named below (consisting of two architects and a painter) under the chief architect of the new town—now R. J. A. Gazzard. The photograph is taken from the southern side of the Dene, a deep wooded ravine which is the most remarkable feature of the new town site—see the site plan below, in which the Dene and other wooded areas are tinted.

In the photograph the housing area known as Dene House occupies the centre of the skyline. The South-West Area, which is illustrated on the following pages, is to the left, merging in the photograph with the old village of Shotton though in fact well separated from it—see site plan. The photograph illustrates the compact and truly urban effect that has been achieved in these two housing areas—snugly set in the landscape but stopping at a firm edge instead of straggling into it.

2, 3 and 4 (foot of page) are typical street scenes inside the South-West Area, again showing the closely built-up character achieved in spite of the predominance of two-storey houses. 2 shows the screened patios provided for each house, the screen walls giving visual continuity to the building line; 3 shows the parking spaces provided off the street; 4 shows another form of screened private open space, parking areas and garages; also (on the right) a split-level type of house designed for middle-aged couples. The viewpoints from which these three photographs were taken are marked on the layout plan, page 91.



HOUSING AT PETERLEE

PETER DANIEL, FRANK DIXON, VICTOR PASMORE

2

3

4

5

HOUSING AT PETERLEE

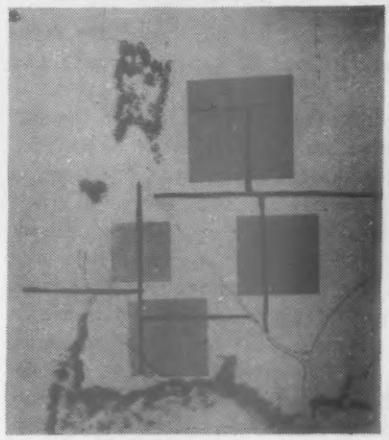
5 and 6, two typical street views, looking in opposite directions up and down Avon Road on the northern edge of the South-West Area—viewpoints marked on layout plan opposite. The cantilever block shown in the left foreground of 5 and in the distance in 6 is a device used in several places to partially close the ends of streets (see also pages 94-95). The houses on the right in 6 are a standard three-bedroom semi-detached type (see plan on page 96) which make up about a third of the total. Between them and the street are private walled patios.

6

This is one of a series of major housing groups which will eventually comprise the South West Area of Peterlee new town. These groups, which are themselves sub-divided into sections, are separated from each other by areas of open space. Each major group will have its own separate identity and character, and the whole concept is held together by a systematic road and landscape layout. The road system is designed to give easy servicing, a sense of simple direction and safe traffic access. Housing groups are planned about 20ft. spine service roads. The service roads join collector roads which focus on to small shopping centres and give access to the rest of the town. The sites of the six schools serving the area are determined by mining subsidence factors, which means that they must be built on reasonably stable land with their adjoining playing fields sited in the open space which is unsuitable for building.

The first major housing group of 388 houses encloses an area of 35 acres. There are 14 different house plans, providing flexibility of living arrangement. Most houses have only one entrance, giving access to a day living-room which adjoins a kitchen, and a sitting-room which can be closed off from the rest of the house. Each house has access to its own private open space. This space —a form of patio—is screened so as to serve as a private extension to the living area; an enclosed space where young children can play under the supervision of the mother, as well as providing the necessary space for the storage of fuel, dustbins, bicycles and prams and for drying clothes outside. The gain of privacy, and the reasonable freedom of the individual to do what he wishes with such space without visually affecting the immediate neighbourhood, outweighs the loss of some direct sunlight into the houses.

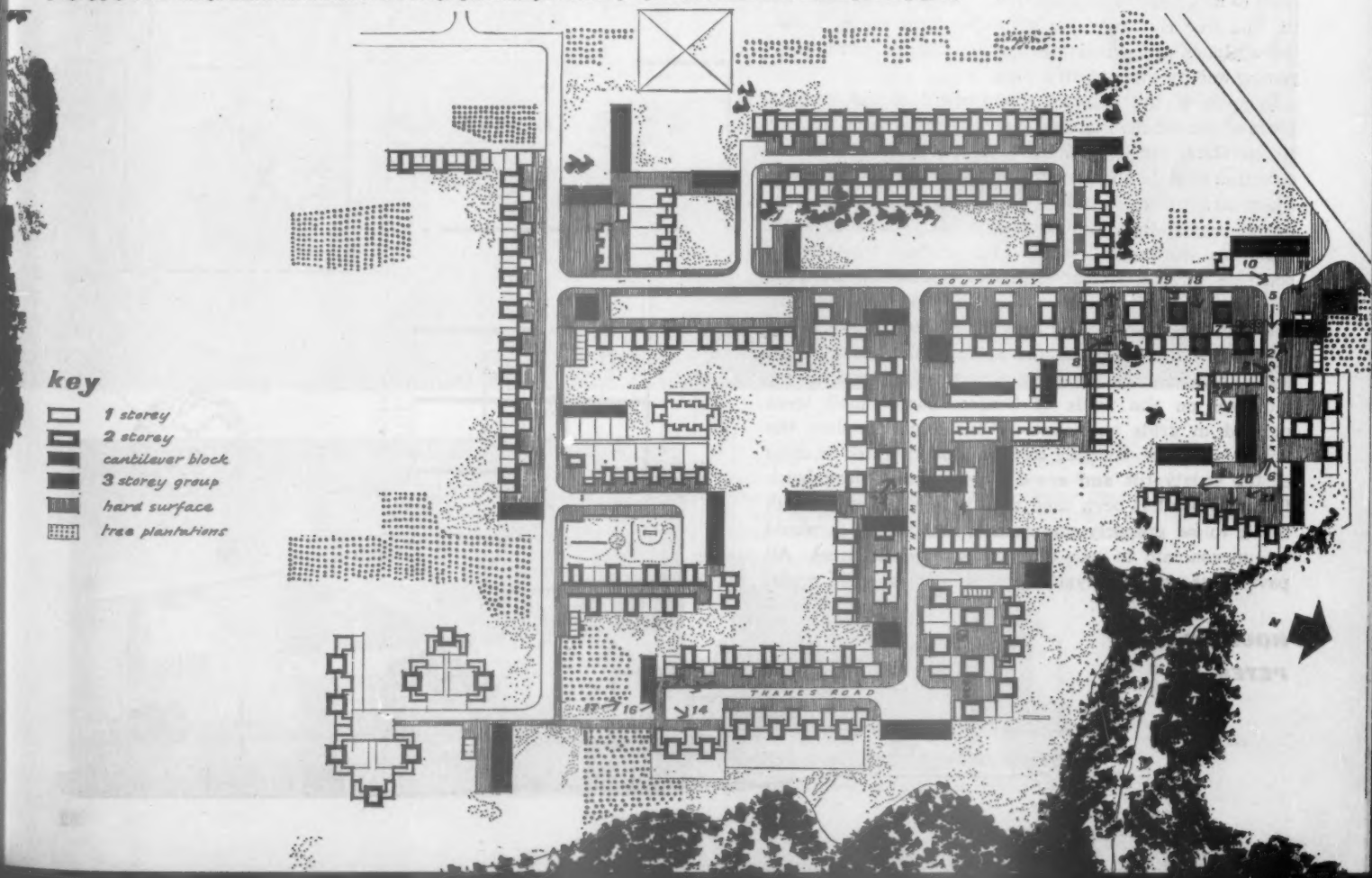
In this closely planned development it was considered essential to provide usable open space near to houses and separated from dangerous service roads, but not



First sketch by Victor Pasmore, showing disposition of the four housing groups that will eventually comprise the South West Area, separated from one another but tied together by the road system. The group illustrated herewith, and shown on the layout plan below, is at the bottom.

to allow the private car, the tradesman's van and the travelling shop to destroy the amenities of the people living in the houses. The street plan provides vehicular access to front and service doors, with related off-street parking space, car ports and garages, but the houses

Layout plan of the first major housing group of the South West Area. The numbered arrows show the viewpoints of the photographs on the accompanying pages. The rectangle encloses the area shown in the larger plan overleaf. The tinted group are those shown in the detailed plan on page 96.



are designed to give the occupants insulation from this scene. In fact one of the major planning precepts of the scheme is that the principal rooms of the houses are visually disassociated from the service roads. This has made it possible to design roads and building facades with their related spaces as true urban compositions, and, in complete contrast, to design uninterrupted and usable open space at the backs of houses. There is therefore no front and back in the normally-accepted meaning of the words. For the 388 houses in the scheme there are 174 attached garages and 31 garages in detached blocks.

Tree planting schemes provide shelter from the coastal winds and define the outlines of each section of housing. Generally they are planted before house construction starts, and 1,500 trees are now planted either as informal groups on the southern boundary or as lines of trees asymmetrical in depth on the western boundary, designed to dissect the two opposing housing groups. Occasional short lines of trees suggest the transition between these open spaces and the geometrically defined space dominated by the housing and roads. The contours of this space are allowed to flow into the existing contours of the surrounding land. Open spaces are designed to facilitate maintenance by tractor-drawn grass cutters.

There are therefore three distinctive treatments of plane within the scheme:

i. The inclined plane of roads laid upon existing contours and determined by pragmatic considerations of road engineering; this inclined plane extends at right angles into off-street parking spaces and garage aprons.

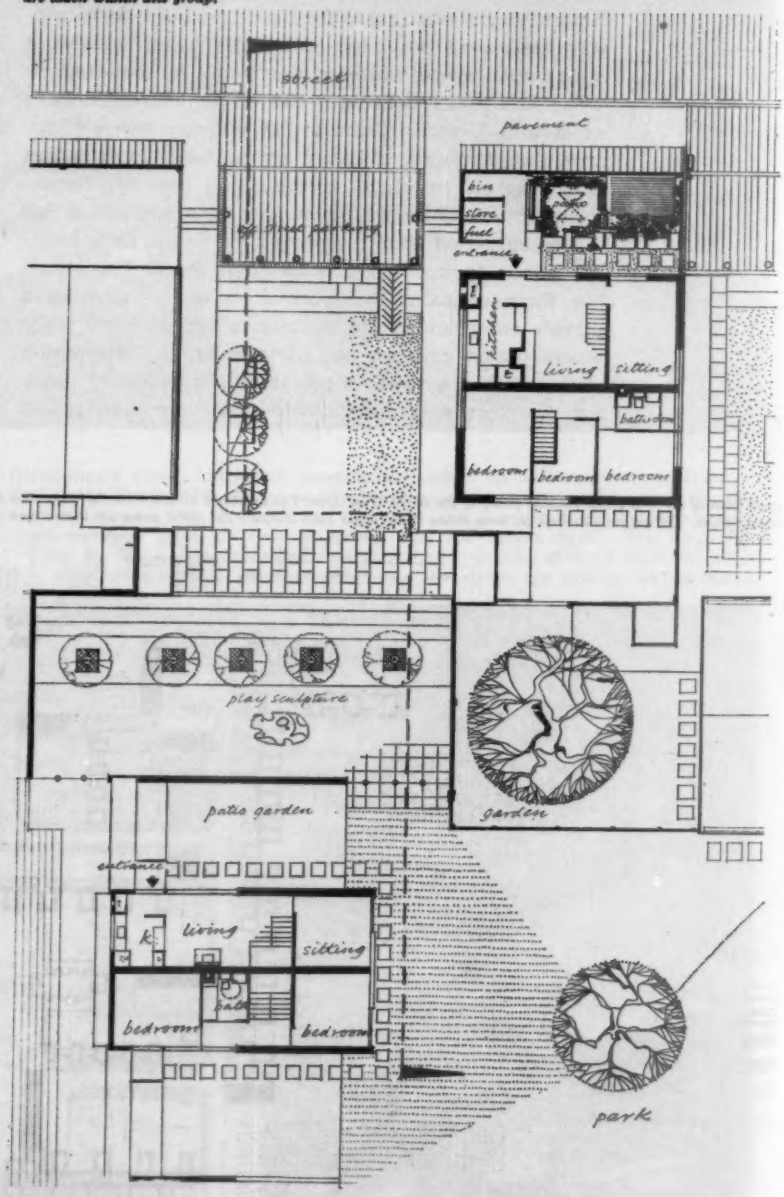
ii. The horizontal planes of houses determined by the need to minimise raft excavation.

iii. The free contour form of major open space. These three planes are joined together by stepped terraces of paving and by short pram ramps.

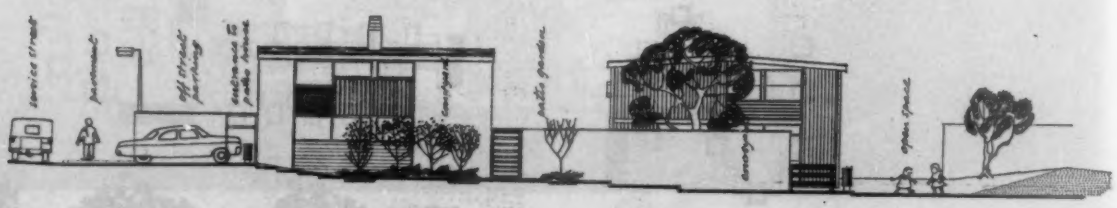
In spite of the ordered arrangement of the various parts of the scheme, no two views of the scheme appear to be alike, yet everything is based upon a 5ft. construction module and a very disciplined use of materials. These are white and black flint-brick walls with grey or creosote-stained timber panels. All space between buildings is designed with three surface treatments: concrete paving; dolomite gravel; macadam. Bollards are used to limit the area accessible to cars. Lighting columns are placed in line with the courtyard walls. They light the footpaths and appear to be part of the house-form. In the small courtyards the lanterns are mounted on the walls of houses. Some small trees planted in grids and close to buildings complete the urban landscape. Existing trees are incorporated in some of the courtyards and are defined in sculptured brick forms. Grass has been used only in areas large enough for it to be properly maintained, and where it would be uneconomic to use alternative hard surfaces. All pavements and courtyards are ramped, so that prams may be wheeled along them.

House construction is a combination of factory-made window and wall units with traditional brick walling. The dominating external colours are all neutral in tone —white, grey and black—and the house forms successfully contain bright curtain colours. In the winter the colour of the scheme seen as a whole blends with the neutral landscape colours of the north-east of England. In summer it is seen as a contrast, set within the green mass of the trees of the Dene.

Plan (below) and section (foot of page) of the group of houses outlined by a rectangle on the layout plan overleaf. At the top is a pair of the standard semi-detached three-bedroom house, and at the bottom a pair of the standard two-bedroom semi-detached house. This detailed plan illustrates the use, throughout the area, of small courts with changing levels separating the houses and of enclosed patios attached to each. 8 and 9 (foot of facing page) are taken within this group.



HOUSING AT PETERLEE



7

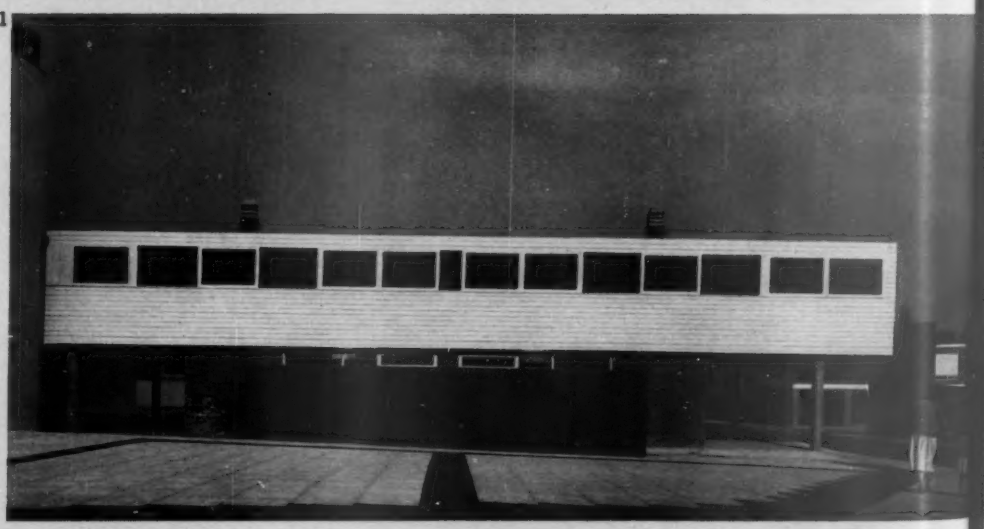
8

9

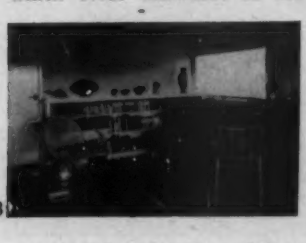
7, looking towards the end of the cantilever block shown in 5 and 6.
8, inside the courtyard shown in the detail plan opposite, with typical three-bedroom house and tree enclosed in a walled garden. The play sculpture was designed by Peter Daniel.
9, looking outwards from the same courtyard, showing the stepped levels and the end house of the terrace across the road.

10

11



At the north-west corner of the area is a three-storey block of flats, on the left in 10. This has two flats on each upper floor and one-person flats on the ground floor. 10 also shows, from outside the group, the cantilever block that partially closes the end of Avon Road—see also 5 (page 90).
11, the same block in elevation.
12, from the Avon Road side, with the flats behind it on the right. These cantilever blocks, which occur elsewhere in the



13

area (see facing page and lay-out plan, page 91) have a three-bedroom flat on the upper floor and, on the ground floor, a garage and a separate apartment for relatives.
13, the living-room in one of these cantilevered flats.

12

14

14, a standard type of one-and-a-half storey, two-bedroom, house with garage and private yard, in this case enclosed by wooden palings. This type has been specially designed for middle-aged couples. The row illustrated stands along the eastern end of Thames Road, at the south-east corner of the area—see layout plan, page 91.

15, at the opposite side of Thames Road, with another type of two-bedroom, semi-detached house, each pair being separated by a pair of garages. The garages are set back only 3 ft.

17

15

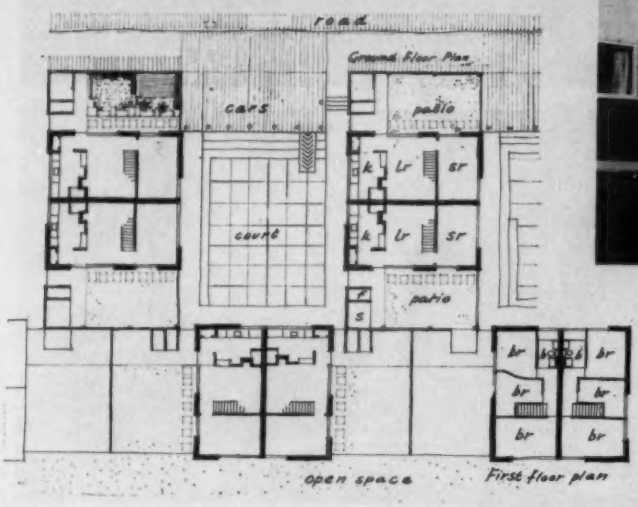
from the footpath, the hard apron required under by-laws being at the side instead of in front. Each house has the space to park two cars off the road.

16, looking into Thames Road from the end, showing the same row of houses and garages. The road is partially closed by a cantilever block (left of photograph) of the same type that is illustrated on the facing page.

17, the overhang of the cantilever block at night, showing its use as a car-port.

16

HOUSING AT PETERLEE



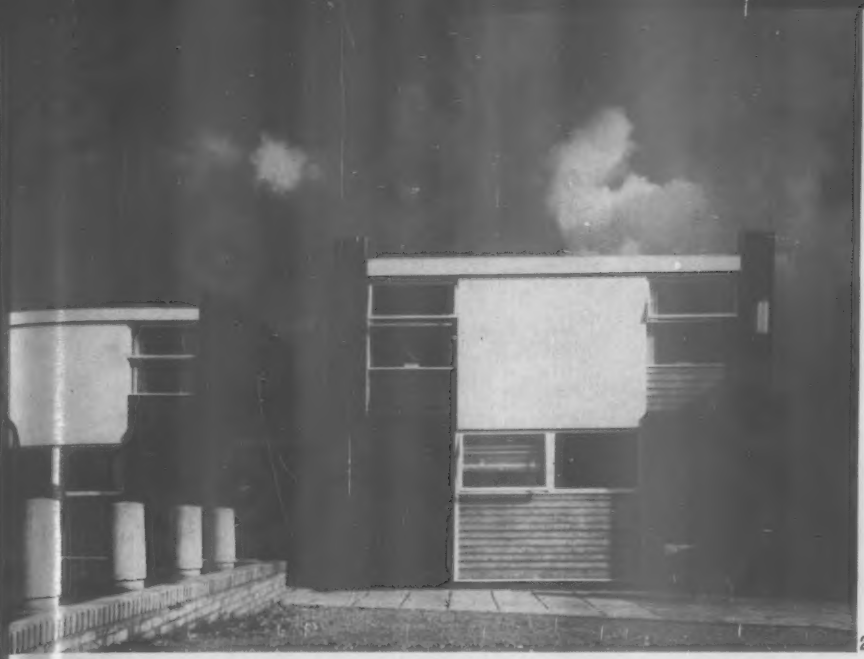
18

This page shows the typical courtyard planning of the type of house most frequently used in the area: a two-storey, three-bedroom semi-detached type. Three pairs surround a paved courtyard, with a standing for cars between the open side of the courtyard and the road—see plan on the left. The particular group of houses represented on this plan and shown in the photographs is coloured on the layout plan on page 91.

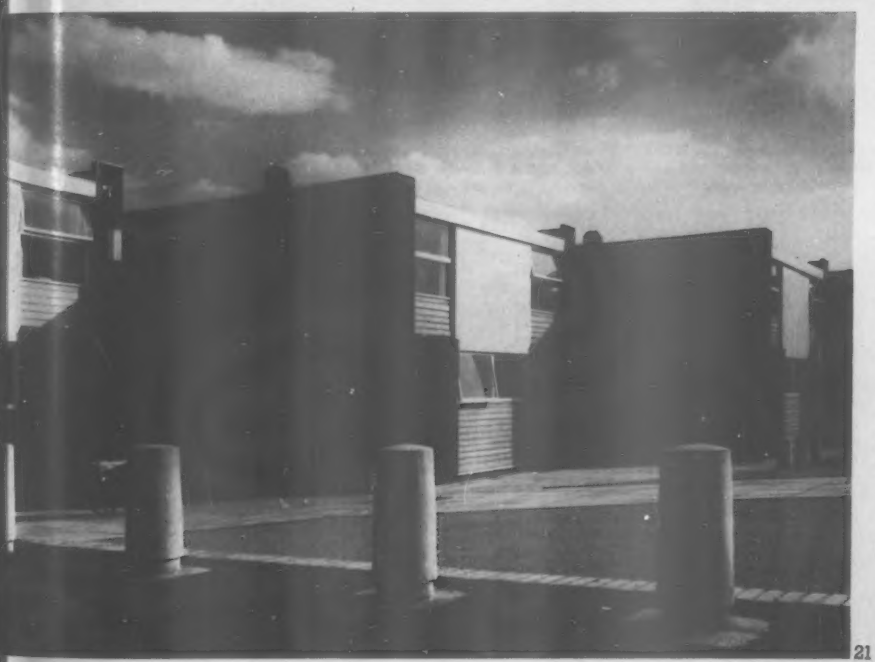
18, looking into the courtyard from the road. Note that the pair of houses on the inner side of the courtyard is identical in plan, but turned sideways.

19, inside one of the private patios that adjoins each house, showing also typical wall and window treatment with simple contrasts between white paint and natural timber vertical boarding.

19



20



21

22

Some other housing types used in the South-West area: 20, a two-storey detached house with three bedrooms.
21, the same house, showing a row of them staggered in plan. These occur at the north-east corner of the area—see layout plan, page 91. They have a large triangular paved area in front and at the back private gardens overlooking the Dene, the wooded ravine that forms the eastern boundary of the area.
22, one of the terraces of three-storey, three-bedroom houses. This particular terrace is on Avon Road—see layout plan—and the photograph shows the side away from the road. The ground floor of each house incorporates a garage, and at the rear on the ground floor is a covered drying area, shown here with washing hanging up.
23, a timber construction designed by Victor Pasmore to serve as a screen on the road side of one of the courtyards between houses — in Thames Road near the southern edge of the area. The screen is coloured on the layout plan.

23

photographs by
H. de Burgh Galwey

1

Louis Kahn's medical research building for Pennsylvania University at Philadelphia, the subject of Professor Jordy's critical analysis beginning opposite, is set among earlier buildings (see plan on page 100) and is first seen from the front rising above the roof of the dormitory building, 1 above. 2, the opposite (south) side, facing the botanical gardens, with the old medical school in the foreground.

2

criticism

William H Jordy

Architect: Louis I Kahn

Medical Research Building for Pennsylvania University, Philadelphia

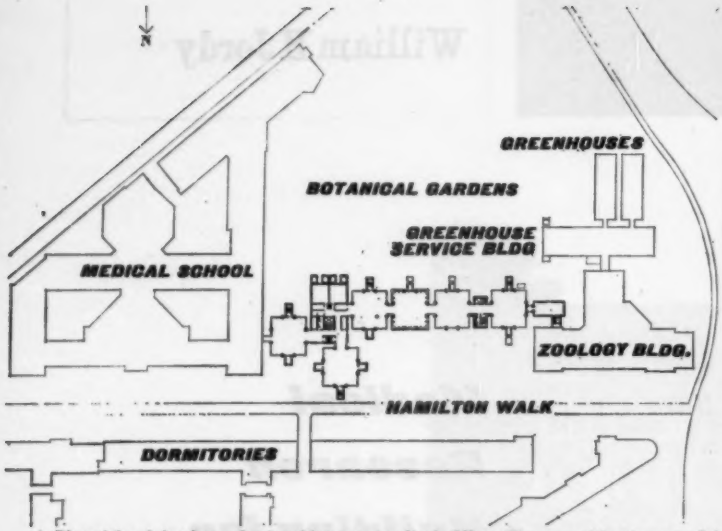
Louis Kahn's medical research building at the University of Pennsylvania has aroused an unusual degree of interest, especially on account of the new integration of form, function and technique that its admirers claim it introduces. It is therefore a fit subject for the first of a new series of articles (to be contributed by different authors) designed to take the criticism of modern buildings in the* REVIEW *to a further stage during* 1961. *The space normally devoted to architectural criticism in newspapers and elsewhere precludes any but a fairly superficial analysis of design, and is generally limited to the subjective appraisal of appearances. These articles will attempt what might be called criticism in depth, analysing the building's response to the programme in terms of planning and structure at the same time as they discuss it aesthetically. Buildings will be chosen not only for their intrinsic interest but for the significant principles and contemporary trends they illustrate.

A *real* building: that favourite adjective of nineteenth-century architectural morality comes first to mind when confronting Kahn's achievement. It is real in its tangibility; real in structure and materials; real in the inevitability with which it unfolds from the basic idea of its conception; hence it is real in its scorn of the ingratiating and the theatrical. It reveals its integrity with a dogmatic earnestness sufficient to have pleased the most ardent Ruskinian or Ecclesiologist. In short, it is not a building of beauty, but one of character.

Such is its inner reality, its private ethic so to speak. But its significance goes beyond itself. The Alfred Richards Medical Research Building represents the long awaited initial synthesis of ideas central to the three great masters of the modern movement, Wright, Le Corbusier and Mies—and this, moreover, in a work which is in no sense a pastiche of its composite inspiration, but an authentic creative act.

If the site is unprepossessing, Kahn has made the most of it. Crowded on three sides by a miscellany of purplish-red brick buildings (with which the brick facing of the new building harmonizes), the laboratories do not appear as one sees them in the elevations pinned up in Kahn's office. In these, the towers which are built, extended by those which will be built (comprising the Biology Building alongside), recall a fortified medieval citadel like Carcassone or, more immediately, the towered profile of San Gimignano. Both are favourite images of Kahn's. On the ground, it is only from the rear, across the cramped Botanical Garden, that one senses the profile of a towered medieval town. Alternatively, a climb in nearby buildings discloses a comparable view, preferably across Cope and Stewardson's turn-of-the-century 'Elizabethan' quadrangle immediately fronting the laboratories. The frothy turrets of this early Beaux Arts fantasy contrast tellingly with the severity of a sterner neo-medievalism, as close to grain elevators as to medieval prototypes.

Since Kahn's building has to be searched out amidst the densely packed urban campus of the University of Pennsylvania, one customarily experiences it first, not as a distant profile, but as from the interior of a medieval town. What is lost as silhouette is gained as physical presence. Hence the masonry towers rise abruptly above one, projecting out from the laboratory platforms and towering over them. The overwhelming sensation, especially to the uninitiated, is the thrust outward and upward of mysterious blind elements from the stacked window areas. A stack of windows occa-



Plan of the whole scheme, showing siting among earlier buildings. The group of four towers on left (three studio towers and a service tower) comprises the medical research building discussed and illustrated here. The other three towers, comprising the biology building, will be added later.

sionally projects as the dominating entity of a particular view; but always enframed by the towers. In most views, however, the window stacks are inset and cradled. 'A building,' Kahn has said, 'is a harbouring thing.'

Only the cantilevering of the floor slabs permitting the climactic glazed corners prevents the voids from losing out in their visual competition with the masses. The physically positive, but psychically negative element of the blind walls oppose the physically negative, but psychically positive element of the fenestration in a staccato counterpoint of solid and void. In this violent opposition of the tangible and the intangible—so different from the comparable opposition in Wright's concept of the building mass as a total entity with the space either enfolding it like a vase or permeating it like a tree—Kahn's building possesses something of the Corbusian starkness of the drama of being and nothingness, where solid and void can shift in their relative meaning.

what it wants to be

If Le Corbusier comes immediately to mind in first experiencing Kahn's building, it is not only because of its sculptural quality, but also because its sculptural complexity stems from a comparable concern to break up the institutional lump into human-sized compartments. Yet if Le Corbusier's plasticity is substantially the arbitrary gesture of his sculptural genius, the hollowing with subordinate cells of the predetermined *prisme pur*, Kahn's image is specifically, even dogmatically, alive to its programme. In his words, the building 'insists on what it wants to be.' The implications are Wrightian and Miesian. The jointed unfolding in terms of the functional programme is Wrightian (Wright almost to the end at any rate). Early Wright especially is here in the jointed growth of the building and its crystalline configuration. The laboratory towers radiate from their heart-core as the prairie house from its hearth-core. Even more, the blind, upended utility towers stiffly gathered around their central spaces recall both the configuration and the function of similar elements in Unity Temple and especially the Larkin Building. The fact that Kahn was not particularly aware of Wright while creating his building merely demonstrates how profoundly it comes to grips with modernity, not by eclectic pilferage, but through the process of its own integral realization.

Wright's specific 'organic' image, however, with its sentimental overtones despite its abstractness, disappears. Kahn's image is more laconic. It grows as a *building*, as the architectonic thing itself. In this respect it possesses an objectivity which is Miesian. Kahn's objectivity, like Mies's, implies a certain passive and didactic approach to form. Thus the building for Mies is 'almost nothing.' For Kahn it is letting the building happen 'as what it wants to be,' before he intervenes to design what it has become—giving line, before reeling in.

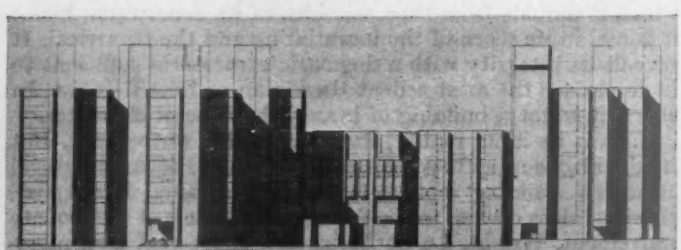
More than any other building to date, Kahn's represents the stage beyond Mies. The meticulous definition of architecture in structural terms, so that the building process clearly appears in what is built, is of course Miesian. So, too, is the discreteness with which each of the elements is set side by side, save for the interweaving of the space-frame ceilings of the laboratory towers. Further, in this self-containment of the major compositional components and the blunt logic of their combination, there is more of Mies's pedagogical deliberateness than of Le Corbusier's intuitive 'primitivism.' In this sense particularly Kahn's building merits his own description of it as 'archaic.' Somewhat impersonal and completely unsensuous, it appears as the axiomatic demonstration of an intensely personal investigation—so stark, so methodical and so comprehensive as, like 860 Lake Shore, to provide an 'archaic' source of inspiration for further (and doubtless suaver) development.

Kahn, however, extends the ideal structure of Mies by giving it concreteness and tangibility in two respects. First, the structure embodies the spaces defined by the activities and services housed by the building. Second, it is more insistent on its own physical actuality. This extension makes Kahn less passive in his approach to design than Mies. After all, his architecture is not 'almost nothing.' It is 'what it wants to be,' while what 'it' wants to be has been extensively preconditioned by Kahn's comprehensive philosophy of architecture.

the life of the building

Since Kahn holds that the spaces containing the activities of the building are its ultimate reality, he starts with these. Merely to provide for the diverse activities sheltered by the building, however, is insufficient. The architect should make them visible, thereby enhancing them for the user and celebrating them for the viewer. Before learning of Kahn's design, the scientists doubtless envisioned their laboratory-to-be as Mies's impassive rectangular box: corridor through the centre, with flexible space to either side, serviced by horizontal utility plenums underfoot and overhead linked, in turn, to vertical conduits and exhausts deeply buried in the building on either side of the central passageway. But Kahn began by drastically altering this standard, while everything that subsequently 'happened' depended on his redefinition.

He started with his conviction that architecture consists in giving maximum visibility to what he alls the 'life of the building,' and then with two premises. First, he argued, the scientist works alone or in a small group, but requires contact with other groups. The ideal laboratory is therefore a cluster



Elevation of the whole scheme, from the north. The completed medical research building is on the left, the future biology building on the right.

of studios and not a warehouse. Second, the scientist works in a complicated and potentially dangerous technological environment. Services should not interfere with the studio and, above all, noxious fumes should be immediately withdrawn from the studio area. Finally, it should be added that the limited area made a vertical building mandatory.

continued on page 103]

3

4

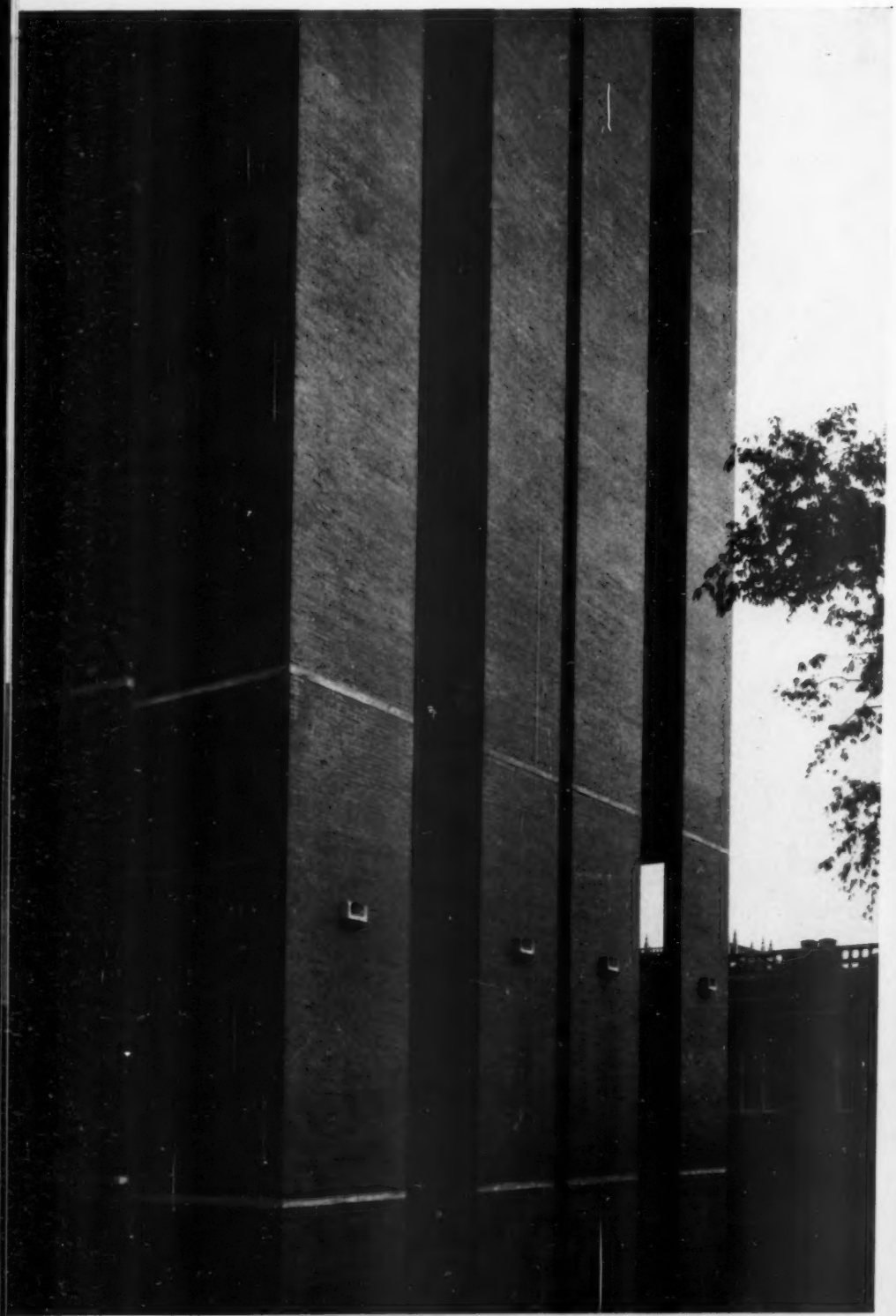
5

3, the rear of the building, facing the botanical gardens. This, the south, side is the only side on which it is not closely surrounded by earlier buildings or by the site of the future biology building—see plan opposite. This will link on to the medical research building at the left of the photograph. The four vertical brick elements on the right are the fresh air intakes of the service tower. On the left is one of the studio towers with projecting exhaust stack.

4, from the east, looking over the roof of the medical school, showing a studio tower in side elevation, another behind it on the right and the service tower behind it on the left.

5, corner of the north front, showing the entrance and, across the bottom corner of the photograph, the footpath (Hamilton Walk) that separates the new building from the earlier dormitory building.

continued on page 103] 100



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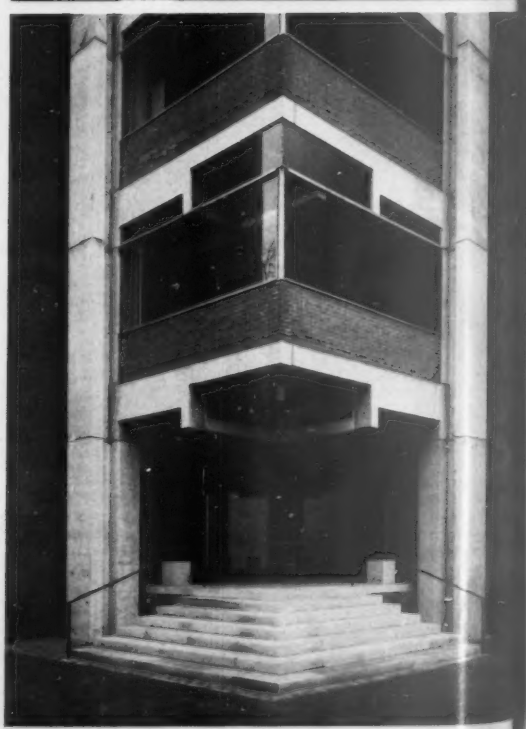


photographs by Cervin Robinson

Louis Kahn's medical research building for Pennsylvania University. 6, close-up of the group of fresh air intakes that form the southern side of the service tower. The small square projections mark the intake 'nostrils.'
7, corner windows on a typical laboratory floor of one of the studio towers.
8, the entrance beneath a corner of one of the studio towers—see also 5 overleaf.

continued from page 100]

Premises of this sort comprise the 'form' of the building, which Kahn differentiates from its 'design.' This differentiation comprises the core of his architectural philosophy, while the full implications of his building are only to be appreciated as its embodiment. Form is 'what characterizes one thing from another.' To use Kahn's own illustration, the 'form' of a spoon is handle and bowl. Hence form has 'neither shape nor dimension.' It simply possesses an 'existence will of its own,' while it is this 'existence will' that determines what it 'wants to be.' The architect begins by discovering the form his building will take. He will find this form, not merely by jotting down his clients' desires nor through mere diligence of research, but only as a 'total realization of thought and feeling' in which he momentarily discards his personal psyche to embrace the particular programme as the 'transcendant act that we share in common.' Hence form is impersonal, while design is personal. Where form is 'what to do,' design is 'how to do it.' Design gives form tangibility as order in a two-fold sense: first, it makes form completely visible as a 'harmony of systems'; then, in the greatest architecture, as a 'harmony of spaces.' Form without design is not architecture; design without form (in Kahn's opinion the defect of most architecture and architectural education) must always be superficial.

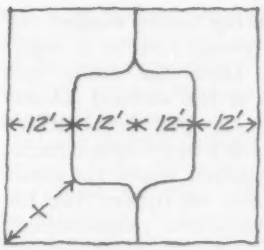
planning for utilities

In starting with the life of the building as the form it must take, Kahn began with his by now familiar division of 'served' and 'servant' spaces. In accordance with his basic premises and the limited site, he upended the standard laboratory as open studio towers, which mediate between a dense agglutination of closed utility towers at the core of the complex building and the thrust of isolated utility towers at its periphery. Where modern technology steadily magnifies the servant appliances of the building, these must be provided for in an architectural manner unless the architect is prepared to relinquish control of an increasingly important part of the building to the mechanical engineer and simply veil the result. Neither buried nor made a decorative fuss about, the utilities are here severely organized within shapes architectonic in their simplicity and scale, and so disposed as to clarify the functioning of the equipment while leaving latitude for future changes.

At the core there are the utility tubes for elevators, principal stairs and conditioned air ready for distribution to the laboratories. Behind these are the stacked animal rooms. Behind them, in turn, a dramatic row of four air-intake stacks dominates the rear elevation of the building. These suck in outside air through nostrils placed well down on the building as sizeable rectangular openings above the Botanical Garden. They bring this air to the top of the building where it is conditioned for distribution down the forward vents. Could Kahn re-do this core, he would so divide the conditioned air stacks that each of the laboratory towers would have its own stack where it links with the central core—perhaps as a cylindrical column with passage to either side. In addition to clarifying the life of the building, this change would also dramatize the entrance to each of the laboratory towers, while incidentally simplifying some of the tightness and awkward runs in the ductwork of the core.

The compacted towers at the centre of the complex contrast dramatically with their isolated counterparts which peripherally house fire-stairs and stacks for exhaust and certain other utilities. Thanks to the latter, noxious fumes are immediately drawn from the working area to be discharged well above this and neighbouring buildings, and far above the 'breathers' placed low at the rear of the building. Where stair towers climb unnecessarily to the height of the exhaust stacks, Kahn has signalized their different functions by cleaving their tops as twin slabs.

Nestled between the dominating utility towers, the stacked

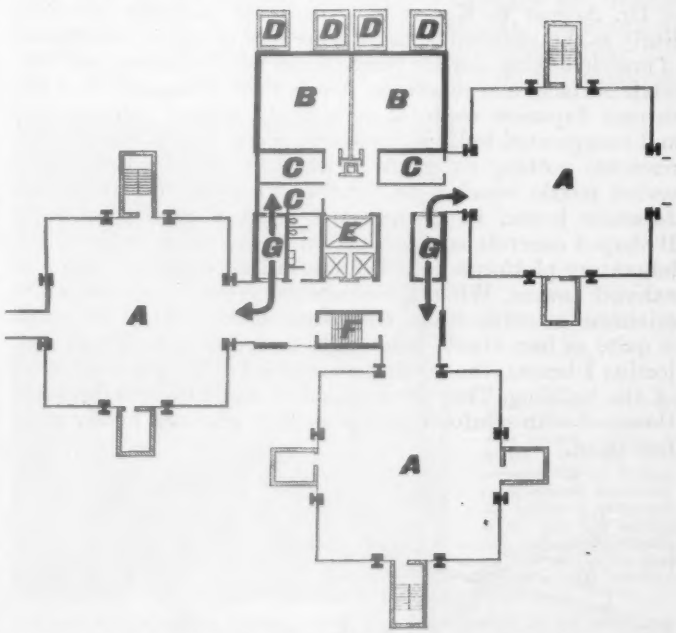


The 45 ft. square of the studio tower gets its dimension from a standard bench module of 2 ft. 6 in. with 5 ft. aisle space; also from a legal plumbing requirement that a vented soil line must not be more than 12 ft. from a fixture. This would seem to produce a 48 ft. square, but a line on the diagonal would then be more than 12 ft.

laboratory platforms are completely free of vertical runs. The size of each platform (45 ft. square) is determined firstly by the requirement that no fixture requiring a soil line be more than 12 ft. from a vented line; then by the ease with which laboratory benches 2½ ft. wide with 5 feet of working space between them roughly accommodate themselves to the overall dimensions. The towers and supporting columns toward the centre of each of these square platforms gives a cross-shaped area of relative shadow toward the centre of each of the laboratory studios. This area can be cubicled for X-ray, photography, isotopes, incubators, cold rooms and storage. Major work areas occur in the lighted corners made possible by the cantilevered slabs.

the comprehensive design

So the 'form' of the building as the revelation of its life stakes out its 'design.' But Kahn makes his 'harmony of systems' fully tangible by its embodiment in a reinforced concrete structure so comprehensively designed that each part serves to a maximum degree simultaneously as con-



Typical floor plan of the whole medical research building (the group already completed and illustrated here), consisting of three identical studio towers with laboratories on each floor, planned round one service tower. Key: A, studio tower (the partitioning into laboratories is shown on page 106); B, animal rooms; C, animal service rooms; D, fresh air intakes; E, lift shafts; F, general stairway; G, air distribution shafts.

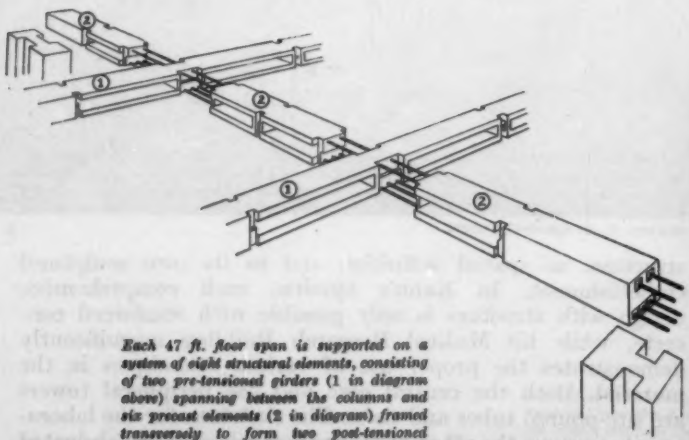
struction, as spatial definition and as its own sculptural embellishment. In Kahn's opinion, such comprehensive design with structure is only possible with reinforced concrete, while his Medical Research Building magnificently demonstrates the proper use of various techniques in the material. Both the central core and the peripheral towers are site-poured tubes and slabs. The skeletons for the laboratory towers, on the other hand, are comprised of prefabricated components, partly pre-tensioned and partly post-tensioned. The poured core element went up first. Once completed this served as a vertical storehouse for each of the trades. Plum-

bers, carpenters, electricians and the other trades worked out of it, as the gangliated laboratory towers rose in a semi-swastika pattern around this core. Once the crane had settled the prefabricated components of the skeletal laboratories into place, more pouring built the peripheral utility towers. Piranesi would have relished such a building spectacle: the cavernous poured concrete core, against which the crane lifted the giant sculptural components of the frame; then the climb of the wooden forms for the peripheral pours outside the frame.

And this sense of the building process remains in the completed complex. It is especially evident in the contrast of smooth and rough concrete surfaces side by side on the interior of the building. Here the exposed sections of the poured work reveal the impress of wooden forms and even the holes where the forms were tied into the pouring. On the other hand, the skeletal components reveal the smooth surfaces, sharp edges and precise tolerances possible only with metal forms, steam curing and factory control. The two types of concrete, in turn, contrast with the unfinished concrete block of the interior partitions (except where a few adamant scientists have demanded their painting), while the purplish-red brick of the exterior shows through the windows. The brick exterior is partly a cavity wall, especially around the animal tower, but mostly a harmonizing veneer which leaves to the interior the fullest revelation of its construction.

the frame construction

Technologically of course the frame is the most interesting portion of the construction; here only the technical abilities of Dr. August E. Komendant made the structure possible. Burly as this skeleton is, there is no 'new brutalist' affectation of muscle-flexing, nor are there the pseudo-Corbusian, wilfully crude surfaces and junctures. Nor is there a suggestion of the current Japanese mode of consciously archaic complication and exaggerated bulk, although its disassembled components resemble nothing so much as the gargantuan notched and seated puzzle which goes together to make the traditional Japanese house. In essence, the skeleton consists of eight H-shaped concrete columns placed at the third points of the laboratory platforms to either side of the peripheral stair and exhaust towers. While their notched cross-section serves to minimize eccentric loads, the visual significance of the notch is quite as important. Essentially as symbolic as Mies's projecting I-beams, the notch here celebrates the jointed nature of the building. They were raised in sections, floor by floor, threaded with reinforcing rods as they rose and finally post-tensioned.

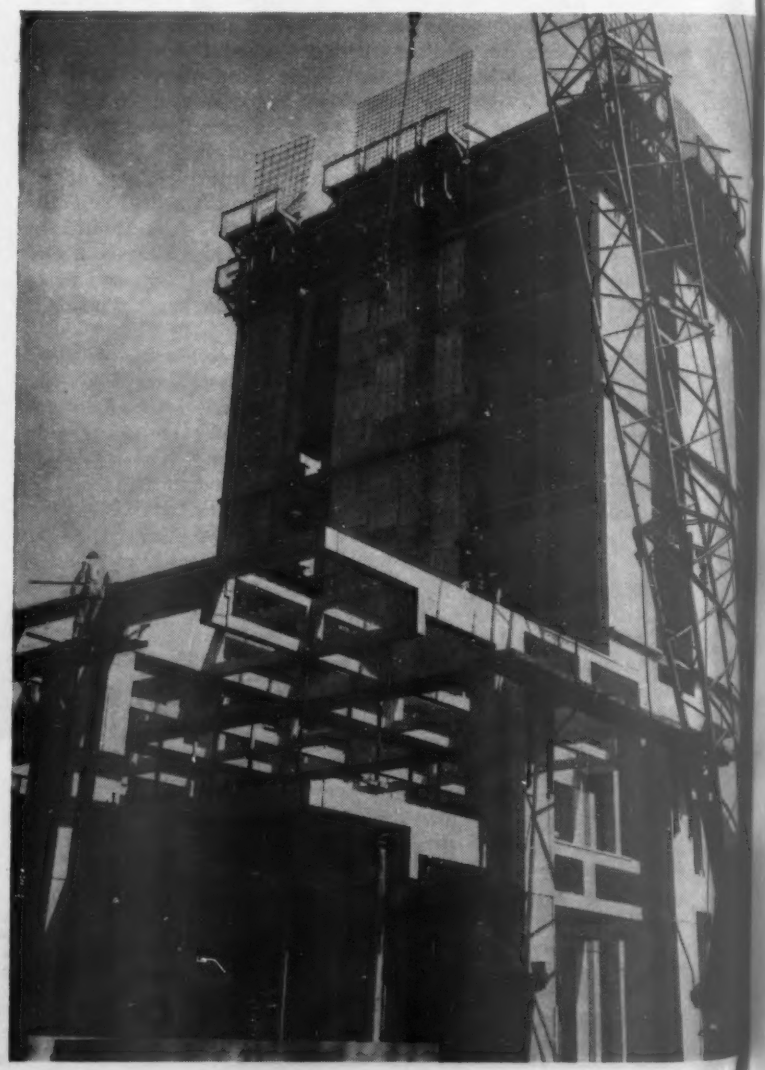


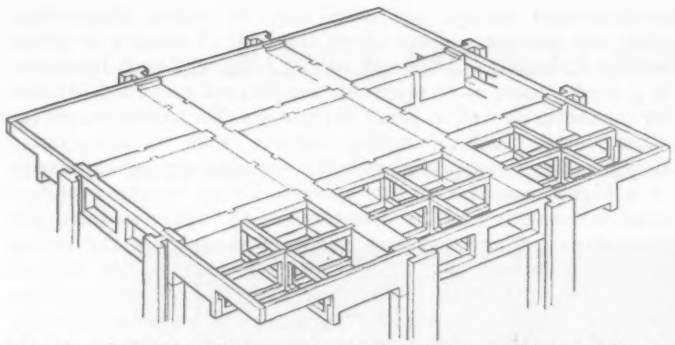
Each 47 ft. floor span is supported on a system of eight structural elements, consisting of two pre-tensioned girders (1 in diagram above) spanning between the columns and six precast elements (2 in diagram) framed transversely to form two post-tensioned girders. During erection, the steel bars were threaded through preformed holes in both the pre-tensioned and the precast girders, by men working from a platform suspended by crane. Plates and wedges were then positioned in recesses formed in the end elements, and the bars were tensioned from one end only—diagram by courtesy of the Stressteel Corporation. Right, a progress photograph of one of the eight-storey towers, showing the assembly of the precast elements.

At each floor, pairs of opposed columns received two *pre*-tensioned Vierendeel trusses, 47 ft. long, 3 ft. deep and 22 in. thick. Obviously the Vierendeel trusses at right angles to the original pair had to be prefabricated as three sections. Once dropped into the seats provided for them, they were threaded with reinforcing rods and *post*-tensioned. Next the stepped cantilever beams around the exterior of the tower went into place, butting the ends of the Vierendeels and completely filling the wider inside leg of the H-shaped column. Finally, the nine squares of the crossed Vierendeels became 36 squares with the addition of secondary trusses in a cross-shaped pattern, where, again, one member spans the full distance while the companion member at right angles to it fits in as two pieces.

Structurally these secondary trusses serve only a minor stiffening function, but they were important during the erection of the building since they supported forms for the floor slabs, thus eliminating the need for propping in this operation.* Since the completed space-frame rests completely on the inside leg of the H-shaped column, each succeeding layer of the column sections locks in the space-frame beneath it in a stepped joint and rises to a flat table ready to receive its space-frame in turn. So the 8-storey tower rose: a layer of column increments; space-frame on top on the inside 'flange' of the H; another layer of column increments locking the space-frame beneath, and ready for another space-frame on

* In future laboratory towers the secondary trusses will be omitted, and with them the notch for the stepped windows, since the placement of so many pieces requires time which a new method of casting the floor slabs makes unnecessary. Larger minimum floor divisions have been established for future laboratories.





The top floor of one of the studio towers, illustrating the basic structure. This is an eight-storey rigid frame with 45 ft. clear spans bridged by heavy Vierendeel trusses supported on H columns. Stepped spandrel beams cantilever outwards from the columns and secondary trusses span between the spandrels and the main trusses. The 3 ft. deep web thus formed contains pipes, conduits, ducts, etc. (diagram by courtesy of The Architectural Record). *The pre- and post-tensioning described opposite kept this system of columns and girders down to manageable size in spite of heavy loading. This is said to be the highest precast frame of its type yet built.*

top. Through the structural webbing of the space-frames, ducts, pipes and cables are angled so as generally to parallel the grid of the space-frame. The intervals between each of the squares provide convenient bays for fluorescent lighting troffers hung from brackets resting on the bottom chords of the trussing.

Space, structure, services: from 'form' to 'design' Kahn's building provides a comprehensive demonstration of the architect's imperative to design a total order. The demonstration is, however, not quite complete. Above all, as Kahn confesses, it lacks the ultimate characteristic of the greatest architecture. The 'harmony of systems' is here; not the 'harmony of spaces,' merely its indication, yet sufficiently present to convey Kahn's meaning. Only at the entrance, where one of the laboratory platforms remains open as a porch, does the result match the conception. For the rest, practically all of the laboratory studios are extensively partitioned into 'areas'—not, as Kahn carefully makes the distinction, into 'spaces.'

the interior's complexity

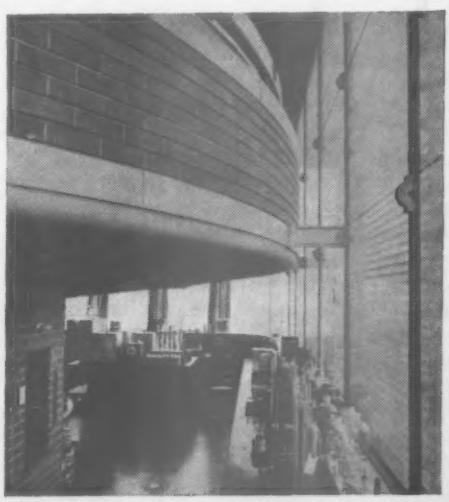
Partitioning through the middle of most of the studios, such as to make a corridor as wide as its link with the central core, tends especially to obliterate the jointed quality of the laboratory towers with the central core, and thereby one's apprehension of the studio conception once inside the building. So complex is the compartmentalization, what with the corridors angled in three directions from the elevators, that the initial effect is loss of direction. It is not, however, the total directional and psychic disorientation which occurs on stepping into the cramped angles of Wright's Price tower, since the rectangular logic and breadth of Kahn's structure keeps us psychically at ease while we locate our destination. What might be a serious defect in a building designed for visitors can, in any event, be a positive virtue in a research centre. And even on first stepping from the elevators, the short corridors are a welcome change from the remorseless bureaucratic alley. Welcome, too, is the lively play of natural light and shadow permeating that part of the building which is customarily relegated to the discomfort of semi-gloom or artificial illumination, at best intermittently punctuated by glare from the fenestration of an end wall or a distant stair tower.

In views across and through the pleated complex, the life of the building, that in it and even around it, attains a climax. It might seem that visual chaos would result in a form world which, at superficial glance, recalls the arbitrary pictorial structuralism of de Stijl architecture of the early twenties. In a sense—and again the density of implication of Kahn's building as an expression of modernity is evident—this building *is* the architectonic realization of explorations ventured upon four decades ago. Once more, however, it is the authority of Kahn's structure as a purposeful and tangible entity which imposes its own order on the kaleidoscopic realm of accident and change. In fact, if within the building the rabbit-warren of partitioning obscures the cellular nature of the space creation, views through windows of other towers outside restore some sense of what is lost.

questions that occur

It is inside the building that certain questions occur. If, for example, the views from laboratory windows are a delight to architects, will they, by this very token, prove a distraction to scientists? Is the promised privacy of the studio laboratory vitiated when another studio looks into it a few feet away? Particularly for some of the lower studios on the inside angles of Kahn's jogging configuration, the outlook seems a bit oppressive, and venetian blinds will doubtless settle the issue outside the realm of architecture.*

The cellular organization of the building raises the more serious question of flexibility. Is the 45-ft. square sometimes too large and sometimes too small? Although problems occurred in organizing the space, the consensus of opinion of the scientists moving into the building seems to be that objections steadily decreased during the process of partitioning, save for some deficiencies in storage and secretarial space. The better than 2,000 sq. ft. of clear space on each platform appears ample for any foreseeable alterations, while flexibility is further enhanced with the ease of communication among departments by stairways and elevators always near at hand. The 'table' structure of Kahn's tower laboratories should, in any event, work far better than the 'tree' structure of Wright's famous predecessor for Johnson Wax, on the function of which there is conflicting testimony. The smaller 40-ft. squares of the Wright tower (alternating with still smaller circular balconies) possess the less flexible arrangement of a central utility core. An inconvenient resiliency occasioned by the bold cantilevering from this core, privacy purchased at the cost of enforced existence

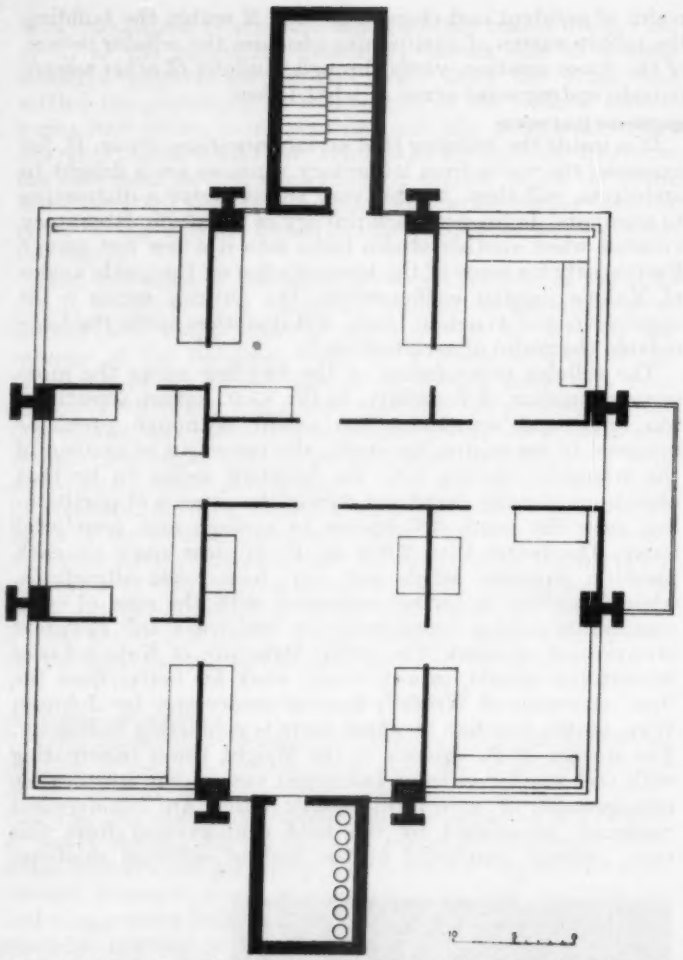


Laboratory interior in Frank Lloyd Wright's Johnson Wax research building at Racine, Wisconsin, here compared with the Pennsylvania research laboratories. No equivalent photographs of the latter are available since the Pennsylvania building was not yet in final occupation when this issue went to press.

behind translucent tubing and the impossibility of locating related laboratories on the same level are further factors in favour of Kahn's solution. But only use will tell.

A significant failure in the studios, however, is insufficient sun control at most of the corners which serve as the major working areas. The tinted pale blue panes (Kahn now wishes they were grey) in the 'transom' area of most of these corner windows clearly afford inadequate protection against glare and outside heat. To be sure, Kahn's building is better in this respect than the too frequent all-glass laboratory, which not only requires the usual countermeasures of venetian blinds and excessive air-conditioning, but often an auxiliary patchwork of insulating board and aluminium foil in order to shield the delicate instruments inside. Metal-mesh screens fitted out-

* The in-line composition of future towers, together with the careful arrangement of laboratory windows so that all look into walls or toward more distant views will eliminate the problems—as well as some visual excitement.



Plan of typical floor of one of the studio towers, showing the subdivision by light partitions into laboratories, the visual effect of which is discussed in this article.

side all windows receiving direct exposure from the sun will help in deflecting the sun's rays; but these have little effect on the glare. And even if fully satisfactory, such screening falls short of the architectonic solution to an important aspect of the 'life of the building' demanded by Kahn's philosophy.

There is reason to wonder, finally, whether the complex ceiling may not become a trap for dirt. Relatively sanguine about the ceiling during the early stages of the project, some of the scientists have second thoughts about its practicality now that they are moving into the building. Only in certain of the microbiology laboratories, which must be as nearly dust-free as possible, do ceiling panels presently veil Kahn's architectural reality; but more may be added. Meanwhile, there are also complaints about the lack of privacy in offices with open ceilings. Although willing to accept such frankness in a work space, most scientists would prefer clothed utilities for aesthetic as well as practical reasons. To architects, on the other hand, Kahn's ceiling asserts with unprecedented boldness the visual potential in the straightforward expression of a highly complex utility system. Every serious architect must be sensitive to the blandness of the space in those few laboratories where panels have been inserted in the ceiling grid, as compared to the invigorating presence of the latticed interweaving elsewhere. Here especially, in the ceilings, the building happens as 'what it wants to be' within a hierarchy of prefabrication ranging from the site construction of the poured elements and the custom manufacture of the skeletal components to the frank acceptance of mass-produced mechanical equipment.

the challenge of Kahn's building

Has Kahn's role as designer been too passive in this last respect? Possibly so; and not merely because of certain practical and aesthetic deficiencies in an arrangement which, for all its impact, is still something of a makeshift. More significantly, his role here seems too passive simply because the logic of his own architectural philosophy suggests the structural integration of utilities into a cavity construction such that corrugations, curves, angles and fusions of one component with another simultaneously disclose the system and sustain the structure. Not merely *containing* the system, as some precast corrugated structures already do, but *disclosing* it within a structural synthesis. This is surely a central challenge which this building holds for the future.

Here, in this ceiling especially, where the dead-white ducts oppose the grey lattice of raw concrete, one senses the Miesian demonstration of the building picked apart by a passionate logic, each element meticulously differentiated from the rest in that severely reticulated manner which magnifies its discreteness and thereby clarifies the demonstration. In fact, unless one entirely misreads the future, Kahn's laboratories promise to be the most influential American building since Mies created the campus for the Illinois Institute of Technology, the Farnsworth House and 860 Lake Shore. The ultimate challenge of Kahn's building is nothing less than the fluid fusion and integration as an entity of what is here eviscerated. When this baroque synthesis occurs, Kahn's building will indeed seem awkwardly 'archaic.' But then it should be even more apparent than now that its archaic quality stems from the search for an unaffected reconciliation of the complex technology of the modern world with the primal elements of building, and these with the primal human responses to shelter. Of such archaism are new worlds born.

DENTAL CLINIC AT CHRISTCHURCH, N.Z.

ARCHITECTS | **WARREN AND MAHONEY**

1, north elevation of the clinic wing.

2

3

4

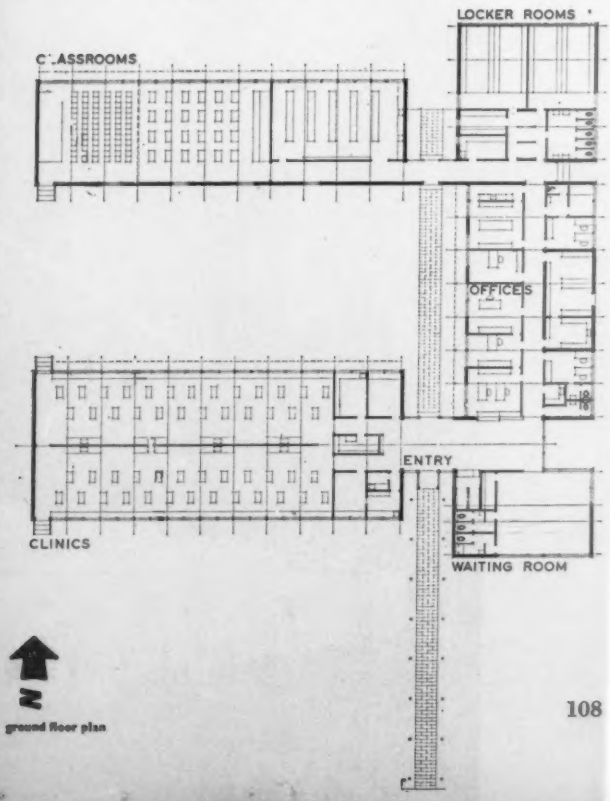
2, the covered way to the entrance, with the waiting room on the right. 3, from the north; on the left are the locker rooms and on the right is the classroom wing. The north walls of the classroom and clinic wings have sunshade canopies; the fixed glass between the canopies is heat absorbent glass in special steel frames and the lower windows are top-hung timber sashes. 4, interior of the clinic wing; it has 52 chairs and electric dental units; the centre columns support the butterfly roof, allowing maximum lighting from the fully-glazed walls.

This training school for dental nurses, accommodating about 100 nurses taking a two-year course, has been built in the four-acre grounds of an old mansion between Colombo and Manchester Streets, within half a mile of the centre of Christchurch. The mansion itself has been converted into a hostel for the nurses.

Besides classrooms, etc., for teaching, the building includes a complete children's dental clinic, which is an essential part of the function of a training school. In the plan the classrooms and the clinic each occupy a separate wing and are connected by an administration wing. Together they form three sides of a square, closed on the fourth side by an existing brick garden wall. The classroom and clinic wings, which require natural lighting, have fully glazed walls facing north. The clinic wing and its waiting room are planned nearest the approach driveway.

A light, one-storey structure was required because of peaty ground-conditions, and as the ground is poorly drained the floor-level was kept high. The administration wing has a timber frame and concrete block walls. The classroom and clinic wings, requiring larger spaces, have light steel portal-frames and double walls of concrete blocks exposed on the inside. The bay-module is 9ft. 4in. The wings have butterfly roofs resting on a central row of columns, designed to give the needed height to the fully glazed side walls. These have shade canopies at two levels on the north side, to protect them against heat and glare, and heat-absorbent glass. There are geared ventilation flaps where the upward sloping ceiling meets the wall.

All floors are timber and partitions timber-framed. Windows are also timber except for the high fixed glazing in the classroom and clinic wings, which are of special steel. Heating is from a detached boiler-house, by means of coal-fired boilers serving hot-water convectors built into the lower panels of the window-frames. In the clinics the convectors run continuously beneath wall-benches at the foot of the tall windows.



ground floor plan

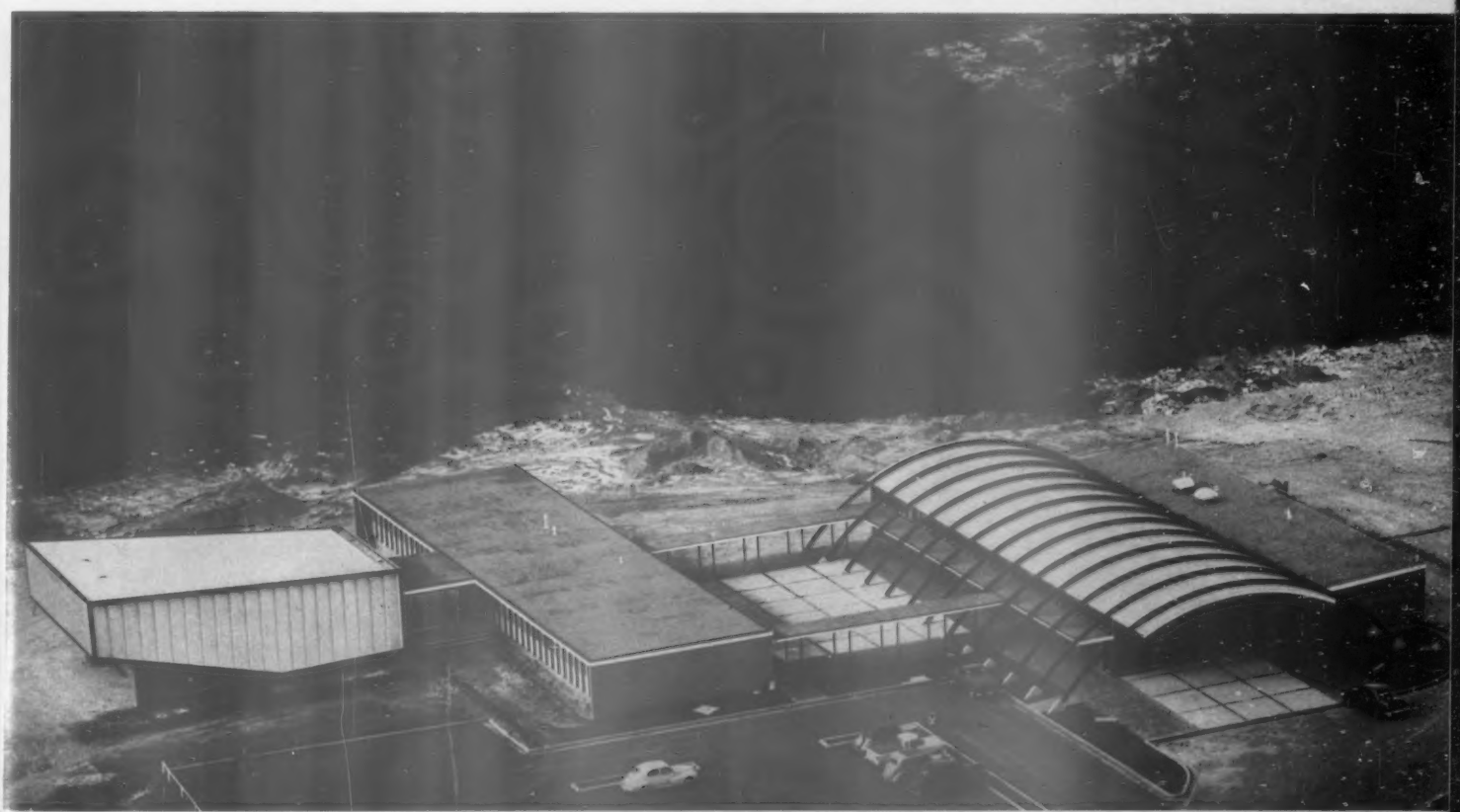
5, the south wall of the clinic wing. 6, locker rooms and offices from the north-east.

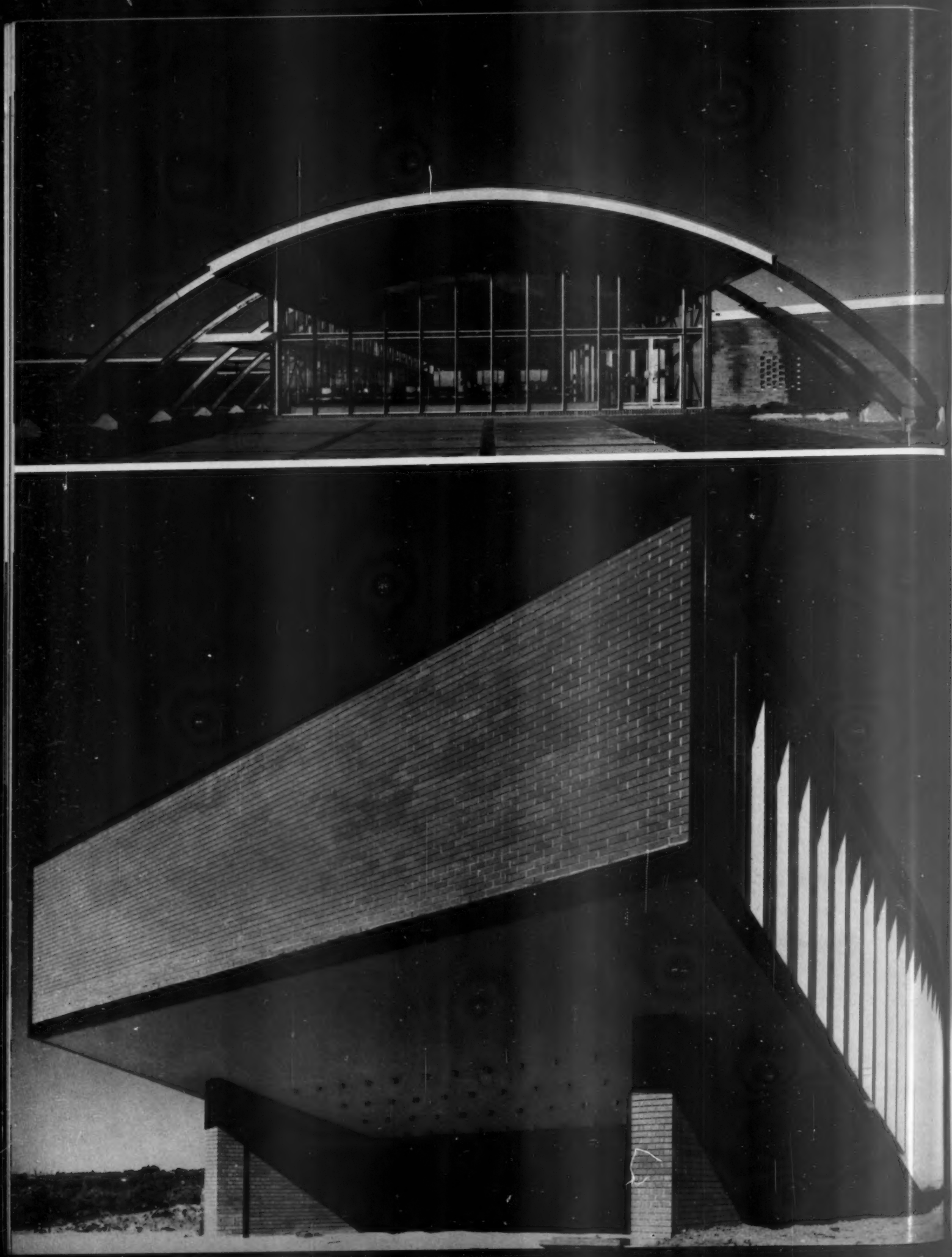
photographs by Martin Barriball

NUCLEAR SCIENCE BUILDINGS AT SYDNEY

ARCHITECTS | **BUNNING AND MADDEN**

1, aerial view from the west; left to right, lecture theatre, studies block, canteen.





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2 (opposite page, top), the canteen from the east; the bowstring arches span 72ft. 3 (opposite page, bottom), the back of the lecture theatre; the aluminium ventilation exhaust vents can be seen projecting underneath. 4, the foyer of the lecture theatre; the ceiling is of polished timber and the wall on the left has acoustic tile panels. 5, interior of the lecture hall. 6, interior of the canteen looking towards the entrance. 7, looking south along the western covered way from the studies block to the canteen.

7

This group of three buildings, for the Australian Atomic Energy Commission, at Lucas Heights, consists of a lecture theatre, a study block (together forming the Australian Institute of Nuclear Science and Engineering) and a staff canteen. The first two are connected by a common foyer, and the canteen is linked to the study block by two covered ways, enclosing a courtyard.

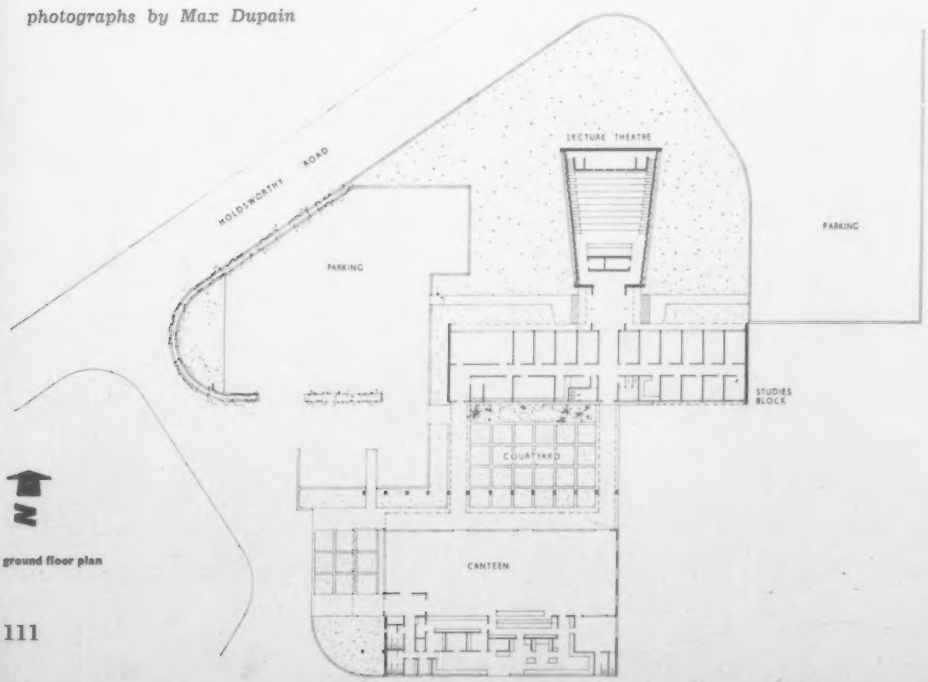
The lecture theatre, which is wedge-shaped in plan and elevation, has stepped seating for 150 people and a floor cantilevered beyond the supporting walls. Its blank side walls, which arise from the need to exclude natural light for film projection, consist of vertical louvres formed of precast concrete panels with an exposed aggregate of white marble chips, each louvre being edged with timber. These walls, and the brick-panelled end walls, are framed in black-painted pressed metal. The theatre has a ceiling of acoustical plywood sheets and is mechanically ventilated.

The study block is a single-storey, flat-roofed structure glazed on the long sides, containing 13 studies, a small library, a conference-room and offices, planned on either side of a corridor. The end walls are in grey cement brick.

The canteen serves 300 people at one sitting. It is a barrel-vaulted hall 26ft. high in the centre with its roof hung from 13 bowstring arches spanning 72ft. between concrete buttresses at ground level. These arches are made of 10in. by 6in. I beams, moulded to shape under heat and pressure. They are exposed externally, and painted black. The ribbed aluminium roof follows the same curve. The wall facing the courtyard is set back, forming a shady terrace, sheltered beneath the edge of the roof, the full length of the canteen. Between this and the canteen is a curtain wall of aluminium and glass.

The service is by cafeteria system with, in addition, a sandwich and soft-drinks bar and a small private dining-room. The canteen has natural ventilation through high-level openings in the two side walls.

photographs by Max Dupain



ground floor plan

NUCLEAR SCIENCE BUILDINGS AT SYDNEY

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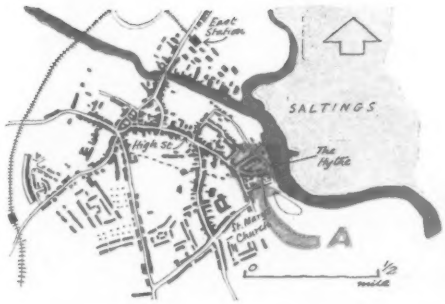
Photographs of Maldon from selected viewpoints such as the riverside **1** *or the top of the High St.* **3** *give a false sense of well being. The decay of the old streets leading down to the riverside, such as Church St.* **2, 5** *and North St.* **4** *(compare with* **7** *and* **8** *opposite) gives no cause for complacency as the following article points out.*

4

This is North St. . . .

5

This is Church St. . . .



*Plan of Maldon showing the riverside area (**A**) which is discussed in detail on the following pages*

TOWNSCAPE

Kenneth Browne

MALDON

Basically, the problems of Maldon, Essex, apply equally well to many another provincial town; gap toothing, waste land at the centre, a spreading rash on the outskirts and, worst of all, no plan. But at Maldon these problems have a special significance. A charming hill town overlooking the wide saltings of the Blackwater estuary it has a fine High Street ***3*** (opposite) leading down to the Hythe, or waterfront. It dates back to the Danish invasions, as its hilltop site suggests, and for centuries the tower of St. Mary's church, ***1***, has been a landmark for sailors. In Maldon, standing on one of the few steep hills in Essex, you are aware all the time of the proximity of the marshes and the estuary—you are linked to them both by smell and by vision—they are there at the ends of the streets ***2, 4*** and it is the contrast of their wide open expanse, inhabited only by seabirds, with the tight built man-made town that is the very essence of the place. It is this which gives it excitement and emphasizes its urbanity. Slacken or destroy the CONTRAST and the essential character of Maldon, what makes it different from the next place, will disappear.

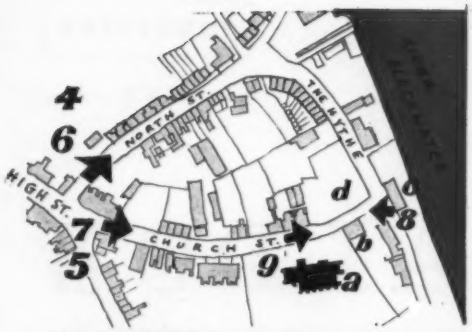
Yet, this is just what is happening, and the state of some of the old streets leading down to the waterfront is summed up in the pictures below of North Street ***6*** and Church Street ***7***. Contrast these with ***4*** and ***5*** opposite, blinkered views which show the true character of the streets, and you see what the local council (echoing the indifference of the inhabitants?) has done to them. Any house not conforming literally with the Housing Acts 'standard of fitness' sanitarily, spatially or otherwise is likely to be scheduled for demolition. Cottages which could well have been reconditioned, and in which people have been living perfectly happily, have been destroyed. The result of practising this blindfold policy without any idea, in townscape terms, of what to do instead can be seen in these pictures. In ***6*** the terraced street line is gutted out on both sides and on the left a piece of subtopian bungalow development inserted which might belong anywhere or nowhere. On the right? Who knows? Another bungalow—semi-dets? In Church Street ***7*** demolished cottages have been replaced by a wasteland of sleezy garages and broken-down cars. Temporary? Yes, but it's been like it for about ten years. No one, it seems, has the least idea what to put there.

This is no plea for automatically embalming every old building regardless, but only that someone with eyes to see should be

6

. . . and this is what is happening to them!

7



Plan of area **A** *showing viewpoints of photographs*

8

9

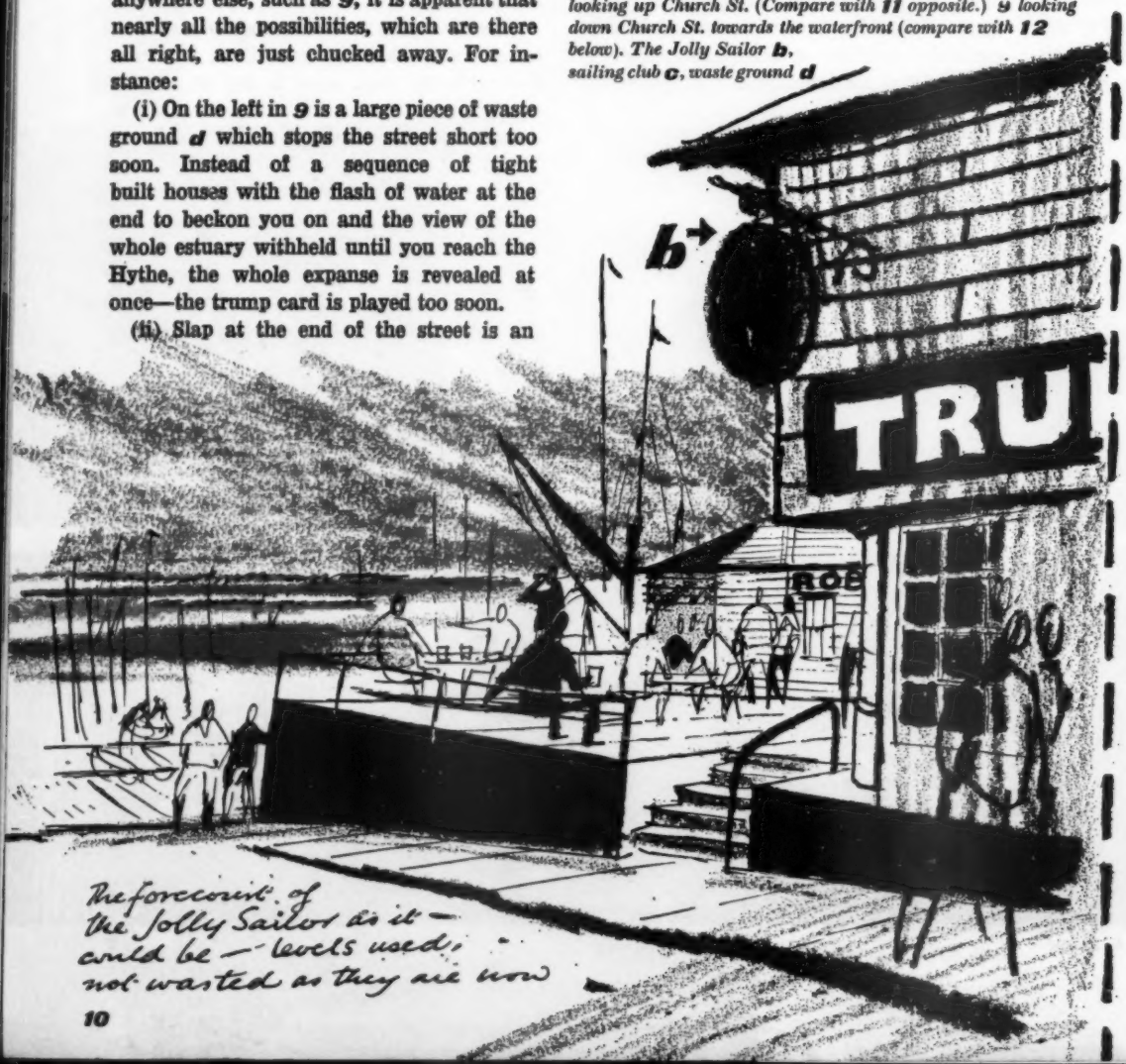
8 *the junction of Church St. & the Hythe seen from the waterfront looking up Church St. (Compare with* ***11*** *opposite.)* ***9*** *looking down Church St. towards the waterfront (compare with* ***12*** *below). The Jolly Sailor* ***b****, sailing club* ***c****, waste ground* ***d***

asked to take the trouble to really LOOK at Maldon (and this applies to a thousand other places), sum up its personality, its potential, and then show how to emphasize not destroy it. Merely preserving individual 'masterpieces' and 'buildings of historical interest,' like currants in a contemporary bun, is not enough. In other words, what is needed is a new kind of town planning—planning for people's enjoyment.

Here is an example of the sort of thing I mean. If we look at the estuary end of Church Street (beyond the church in *7*). From one viewpoint (*2* on page 112) it has that special visual excitement, the surprise of masts seen over the rooftops. But from anywhere else, such as *9*, it is apparent that nearly all the possibilities, which are there all right, are just chucked away. For instance:

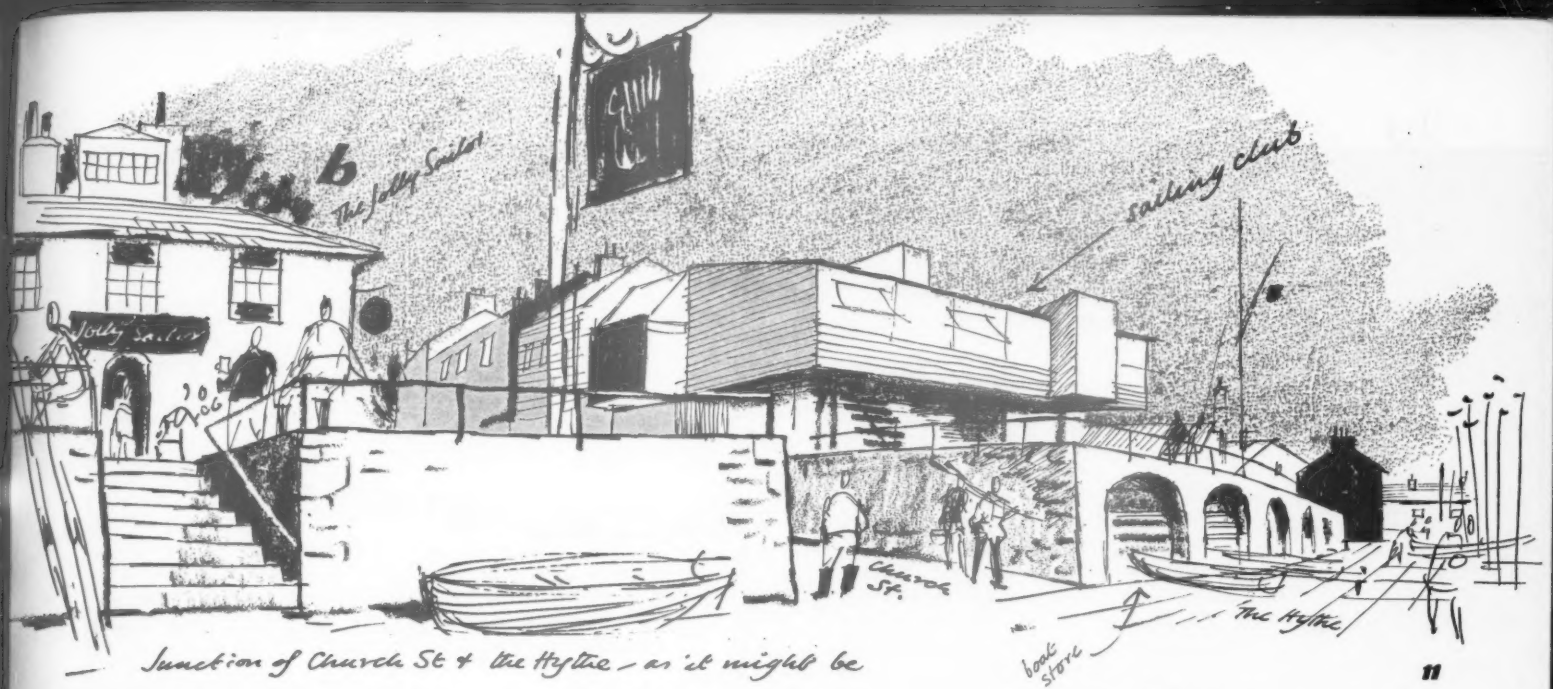
(i) On the left in *9* is a large piece of waste ground *d* which stops the street short too soon. Instead of a sequence of tight built houses with the flash of water at the end to beckon you on and the view of the whole estuary withheld until you reach the Hythe, the whole expanse is revealed at once—the trump card is played too soon.

(ii) Slap at the end of the street is an



The foreground of the Jolly Sailor as it could be — levels used, not wasted as they are now

Kenneth Browne



— Junction of Church St & the Hythe — as it might be

11

atrocious asbestos hut *a*, 'do it yourself' headquarters of a local sailing club—not only an eyesore in itself, but in the worst possible position.

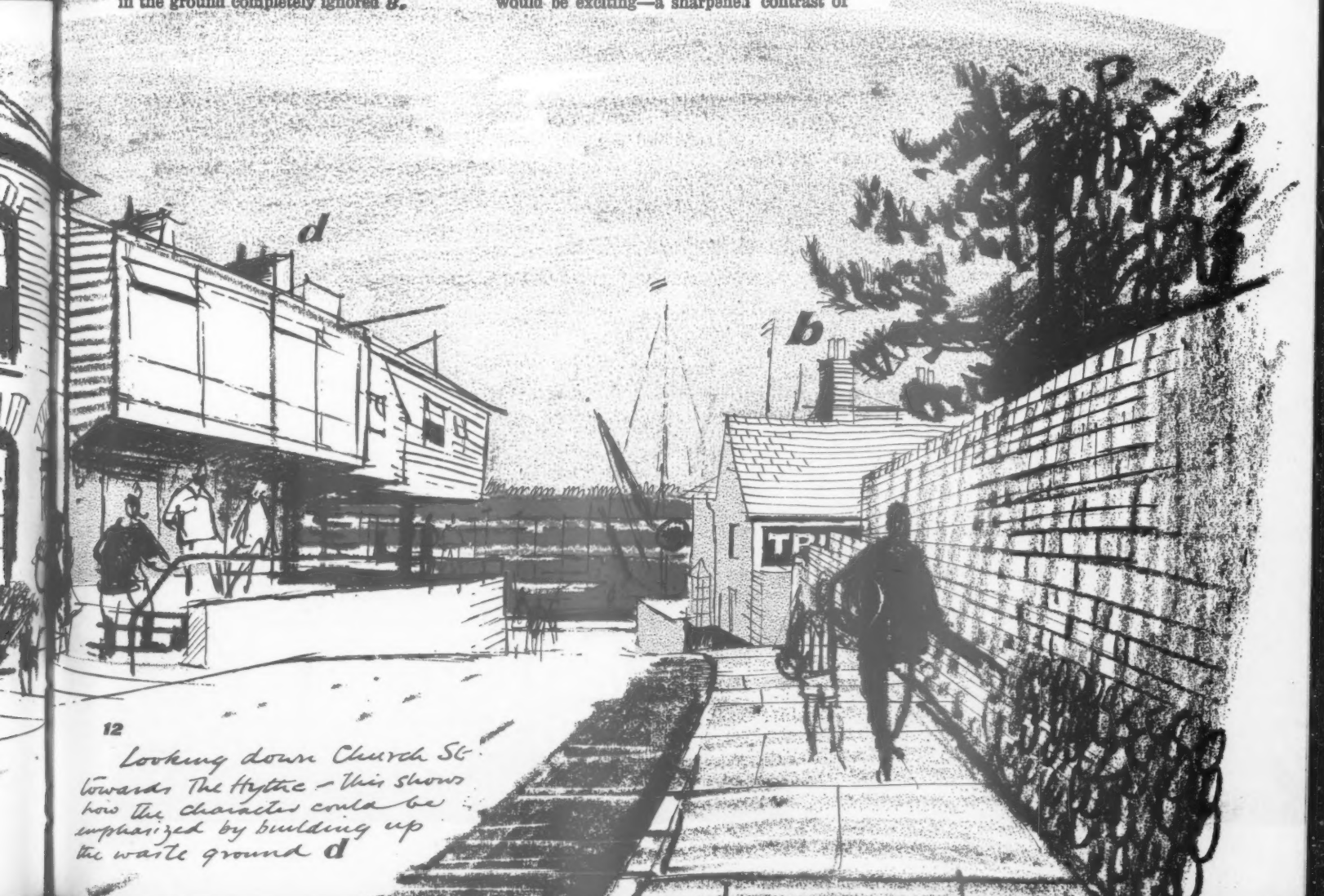
(iii) The forecourt of The Jolly Sailor *b* (inside full of character with walls virtually papered with pictures of sailing barges) is just so much tarmac and clutter, the fall in the ground completely ignored *8*.

What could be done?

First of all, I suggest, build up the corner of wasteland (see *d* in *8*) possibly using the river frontage for a new sailing clubhouse (replacing the asbestos hut already mentioned) with boat storage underneath and with the line of cottages continued down the hill *11*. Now the view down Church Street would be exciting—a sharpened contrast of river and buildings *12*.

In front of The Jolly Sailor, the fall in level should be used to build out a tough sort of terrace—forming a splendid vantage point to watch the sailing *10*.

This is just a single instance of the kind of sympathetic rebuilding which is needed —emphasizing character not dissipating it.



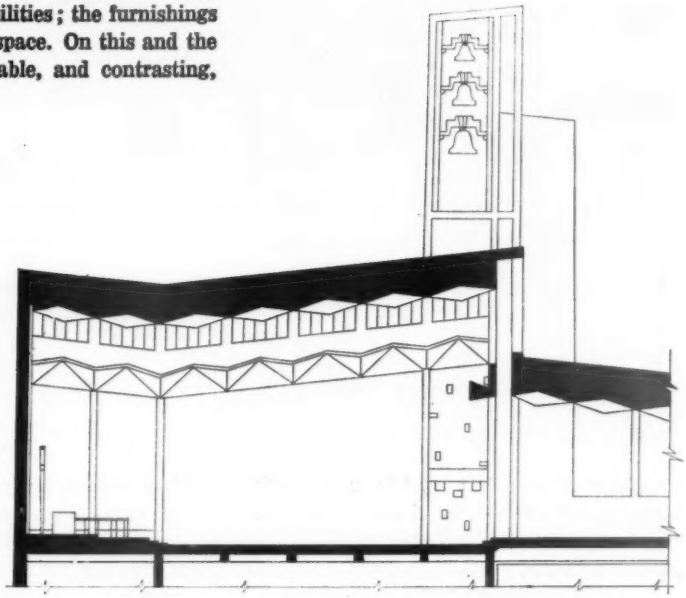
12

Looking down Church St towards The Hythe — this shows how the character could be emphasized by building up the waste ground **d**

chancels of two recent churches

The acceptance of Liturgical—or any other—planning theory for churches does not (as was pointed out in AR December 1960) absolve the architect from his design responsibilities; the furnishings must be conceived in relation to the interior space. On this and the following five pages are illustrated two notable, and contrasting, examples of the well-furnished church.

Situated in the Hogdalen community centre, in the southern suburbs of Stockholm, the Vantör church has had to be packed on to a difficult narrow site with considerable changes of level. The youth club and other subsidiary accommodation are in the lower part below street level leaving the upper part clear for the church proper, a red brick structure roofed with a complex system of concrete vaults which can be seen in the section of the chancel, right, and the illustration opposite.



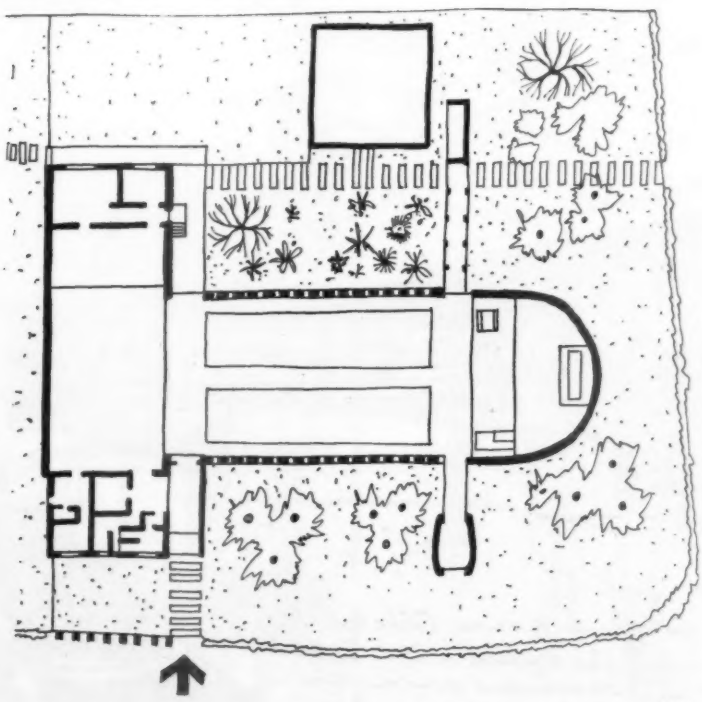
church at Vantör *architects: Berndt Alfreds and Gunnar Larsen*

ID *a monthly review of interior design*

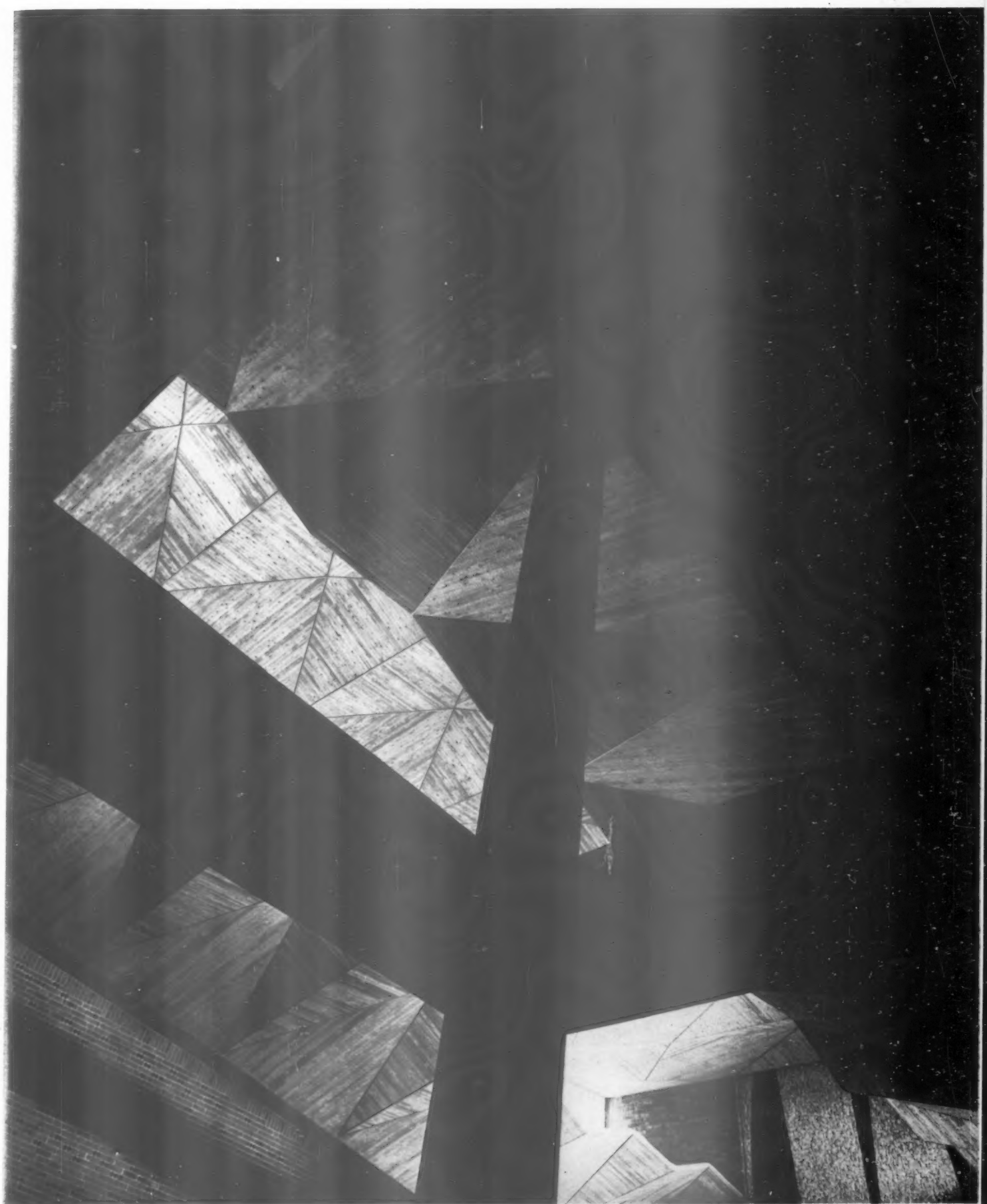
1, the chancel roof of the church at Vantör, seen here through the sub-structure of the bell-tower, opposite, showing the cantilevering side vaults and the main vault above, all in carefully shutter-patterned concrete which sets the tone of rich simplicity for the furnishings.

church in Sheffield *architects: Sir Basil Spence and Partners*

Saint Catherine's, Woodthorpe, was built, to serve a suburban community, with war-damage funds transferred from a church in central Sheffield. The plan shows the church hall built across the end of the nave, into which it can be opened to accommodate large congregations, the square vicarage (brick built, like the church itself) to one side of the main building and the bell tower (two curved walls of brick) on the other. The chancel is a plain apse, which forms a kind of cyclorama behind the liturgical furniture.



Illustrations and description of the interior of St. Catherine's appear on pages 120-121.



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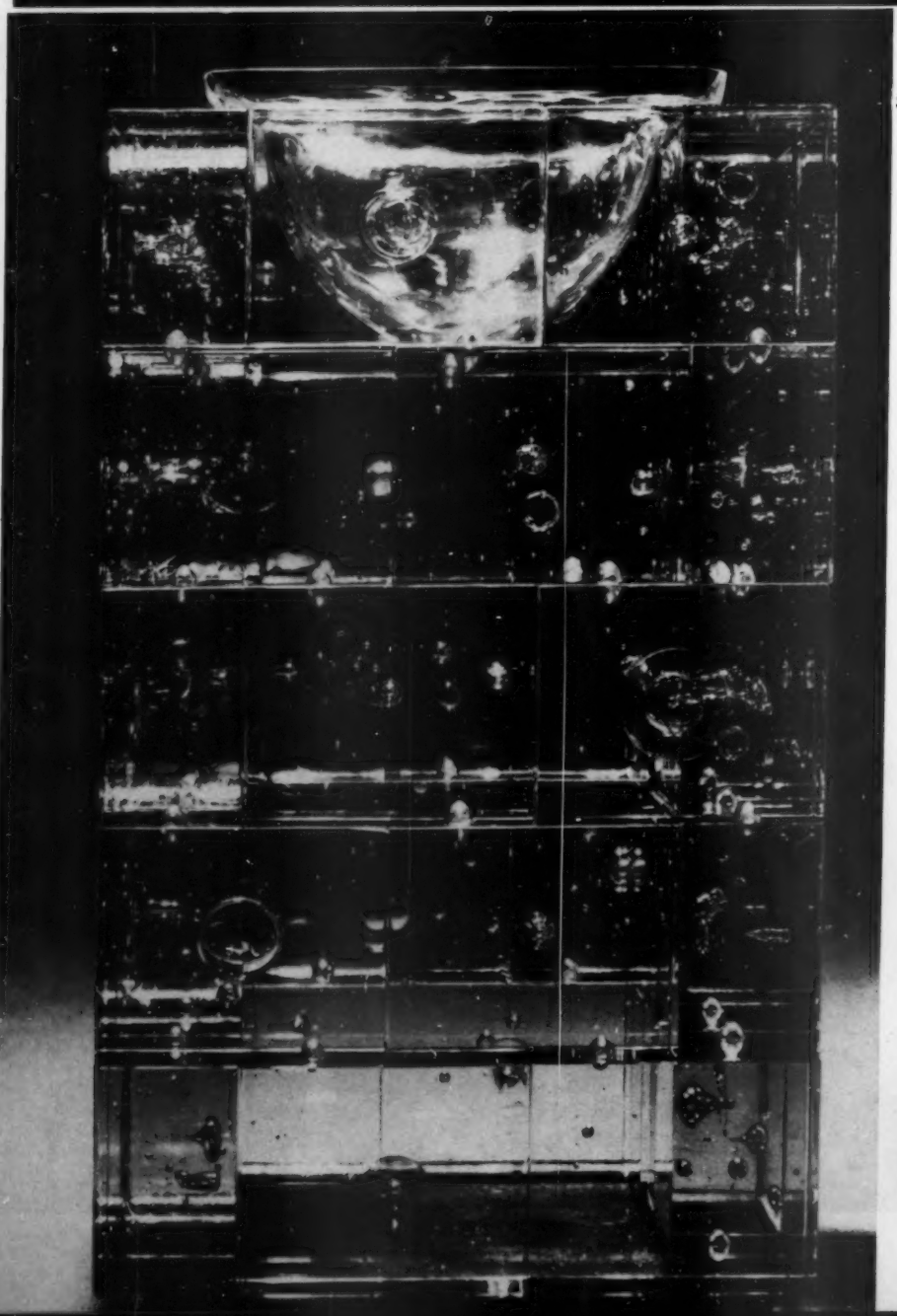


3

2, general view of the interior, looking toward the chancel. The sub-structure of the bell-tower is seen in front of the right-hand wall of the chancel, while the font can just be made out in front of the right-hand window side-lighting the altar.

3, the font, designed by Sven Palmqvist and built up out of blocks of air-bubbled Orrefors crystal glass, with a font-cover of the same material.

4, exterior of the church from the chancel end.

5 (opposite) one of the doors (and part of the over-door) of the main entrance to the church, executed in copper by Fritz Sjöstrom.

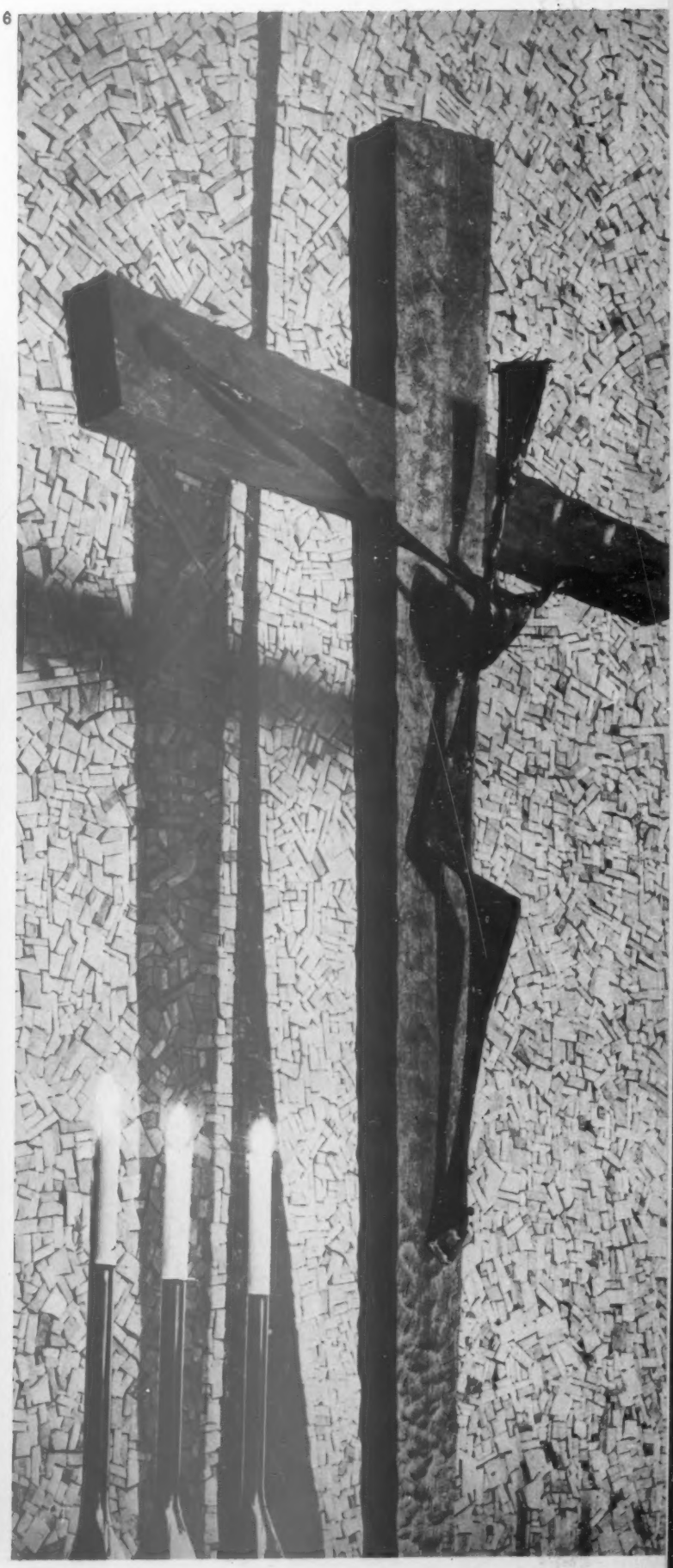
6, altar candlesticks and crucifix, in wrought-iron on a wooden cross, by Arne Jones, who also made the weathercock on the bell-tower. The wall behind the altar (see also 2, above) is covered by a mosaic of riven stone tesserae by Gert Marcus.

4

Church at Vantör

5

6



Church in Sheffield

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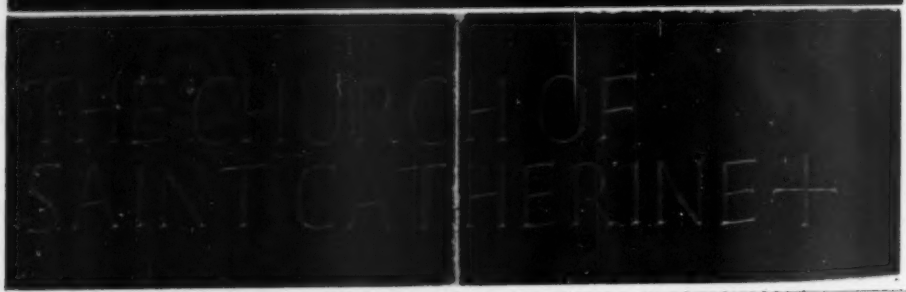

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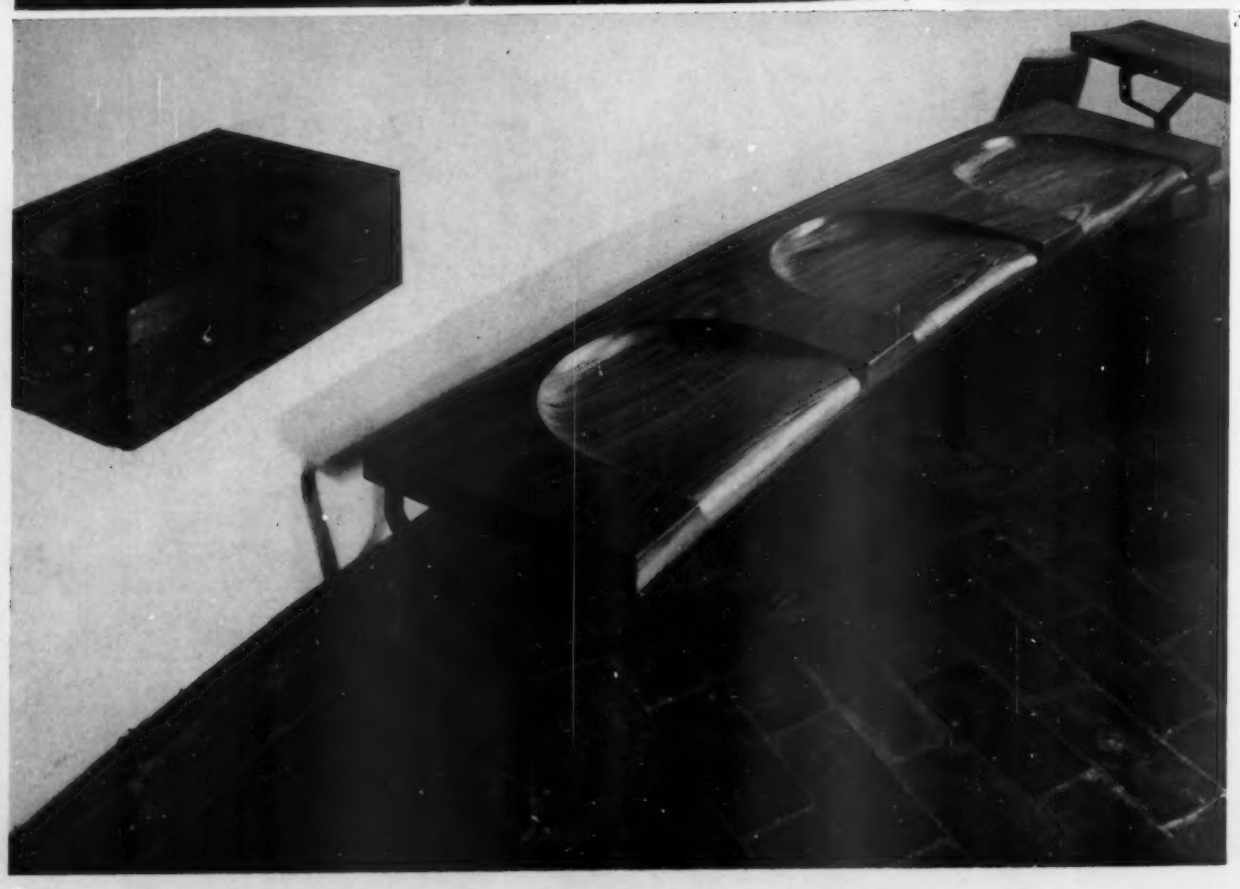
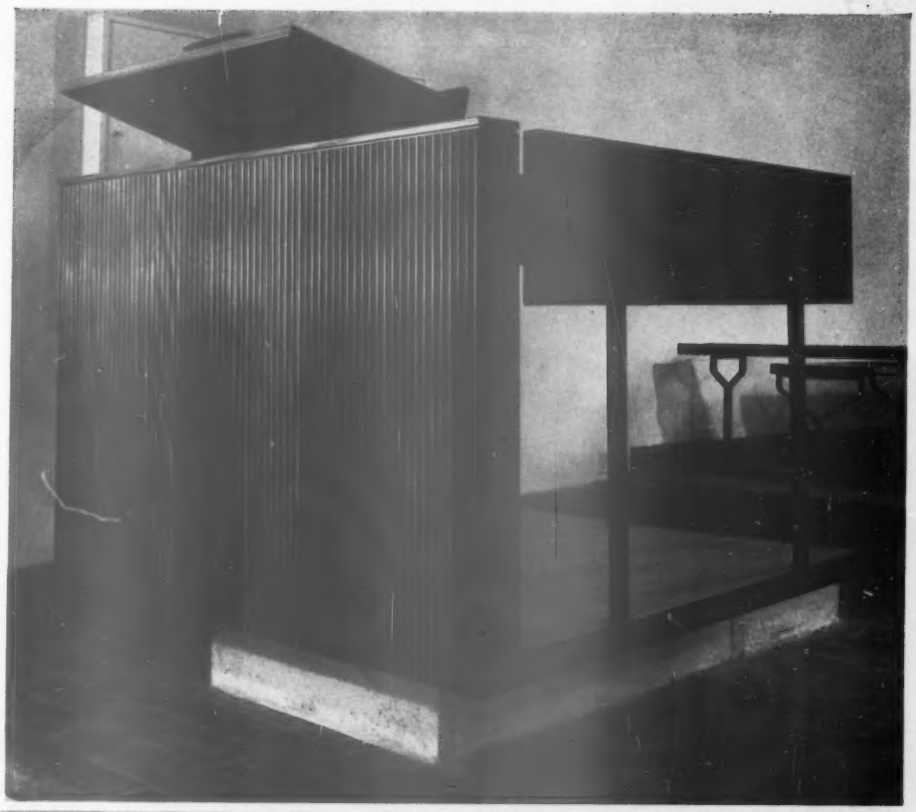


4

1, the interior of St. Catherine's, looking toward the apse, which is lit by a clerestory in a step in the roof at the line where the nave joins the chancel.
2, lettering on the exterior slate facing, cut by Ralph Beyer.
3, exterior view from the east, showing the tower, the outer wall of the apse, and the vicarage just visible behind the tree.
4, close view of chancel furnishings—piscina cut from a block of blue slate cantilevering from the wall, sedilia with afrormosia seat carried on welded steel legs, floor of blue paviors.
5, a lectern—like all the chancel furniture, it is in afrormosia and purpose-designed by the architects.
6, the font, carved from a single block of Derbydene marble, the lid surmounted by a dove designed by the



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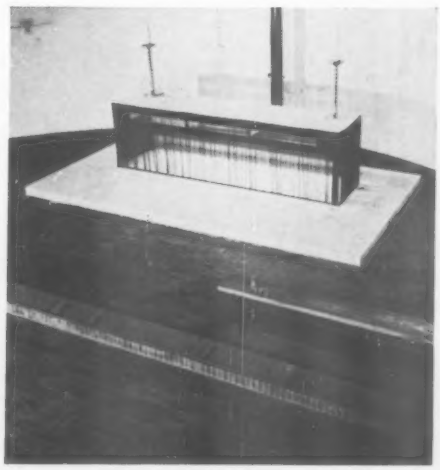
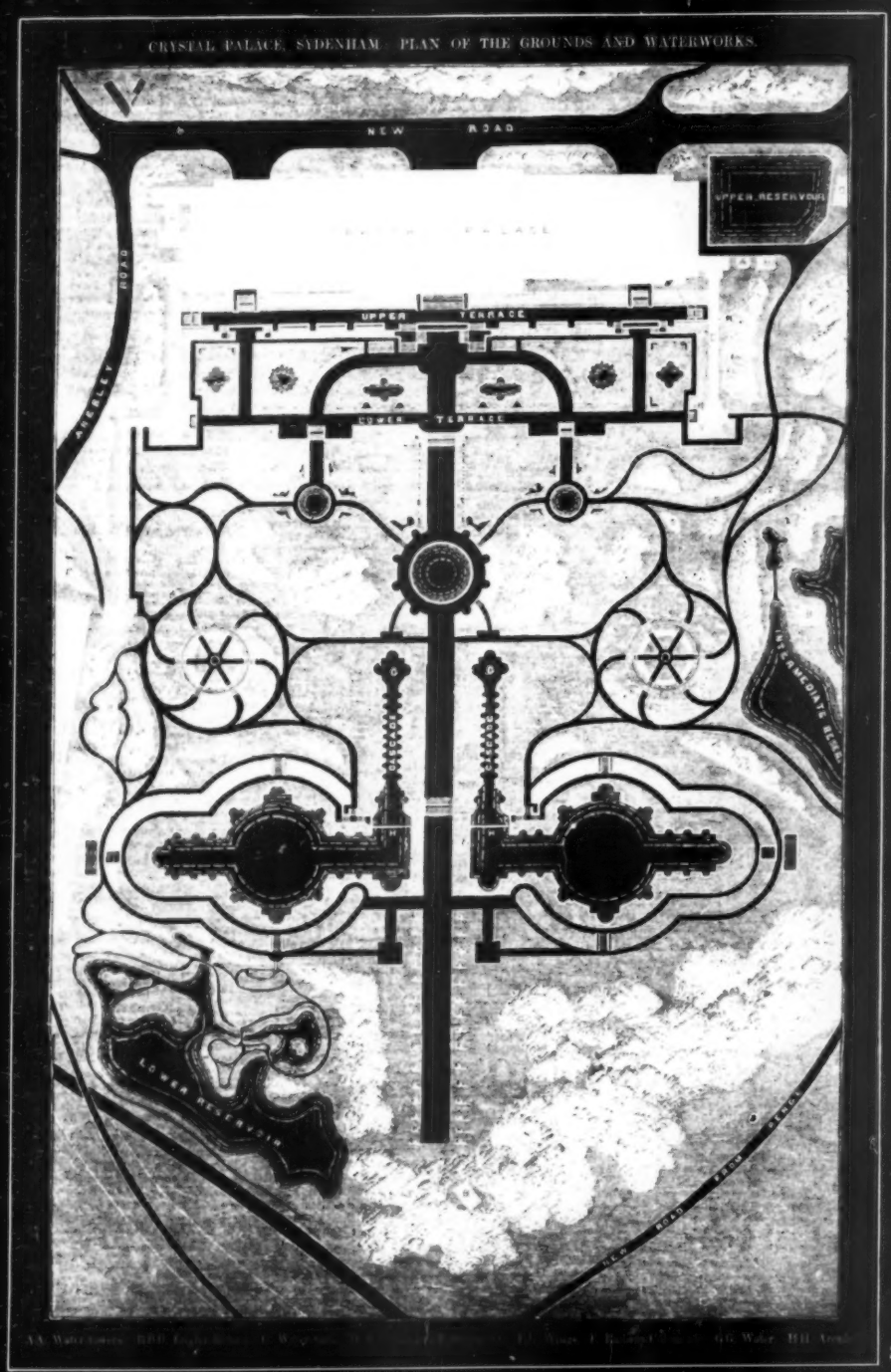


architects and executed in reinforced cement, with a bronzed surface, by Anthea Alley.
7, the altar, on its dais of white Hollington stone, is a plain table with drapery that does not conceal the fact of its being a table. Candlesticks in silver, the cross (see also 1, opposite) of wood, secured to steady-brackets on the wall by pegs corresponding in position to the nails of the Crucifixion.

1



2

While much has been written about Joseph Paxton's Crystal Palace, little attention has been given to the garden setting Paxton himself designed for it at Sydenham Park—no doubt because of its conventional style compared with the epoch-making style of the building. The gardens are nevertheless an essential part of this significant mid-Victorian episode, and are here described by Dr. G. F. Chadwick, lecturer in the Department of Town and Country Planning at Manchester University, author of a definitive book, *The Works of Sir Joseph Paxton*, which is now in preparation.

1. an early project by Paxton for Sydenham Park (from the *Civil Engineer and Architect's Journal*, 1852). It includes a large suburban development to the north as well as variations in the detailed layout of the waterworks, etc. 2, the final plan for the grounds and waterworks (from the *Builder*, 1856).

G. F. CHADWICK

PAXTON AND SYDENHAM PARK

After the dazzling success of the Great Exhibition of 1851, a success largely due to its unique building, Paxton was unsuccessful in his fight to retain the 'Crystal Palace' in Hyde Park as a permanent winter garden where, amidst 'the climate of Southern Italy, multitudes might ride, walk or recline amidst groves of fragrant trees.'

Instead, he launched a company to acquire the building and to rebuild it in a greatly enlarged and amended form on a new site at Sydenham. This second building, which gave its name to a bus terminus and railway station, as well as to a football team, is now enshrined in the history of the modern movement in architecture, and its story has been recorded too often to need repetition; that is, the story of the building. But the grandiose gardens and the park below them have received scant attention despite their contrast to the great glass and iron envelope for which they were the specially designed setting, and despite the eulogistic plaudits of the contemporary press at the height of their ornamented fame in the late 'fifties and the 'sixties. Paxton ranks with John Claudius Loudon (and perhaps William Robinson) as one of the great gardeners of the Victorian age.

The second Crystal Palace was launched on the crest of a tide of financial optimism: an optimism which was often a justified feature of Paxton's schemes, but an optimism which also, on occasion, led to difficulties not encountered by more prudent, if less exciting, projects. The site acquired was a superb one including the highest point immediately south of London, an area which was well treed and towards which the aspirations of builders were already turning. Consequently, of the two estates totalling 349 acres, which had been acquired for some £167,000, 149 acres were immediately sold for £100,000, leaving the 200 acres retained costing only two-thirds of this sum. Before this transaction had taken place, however, Paxton had prepared a scheme, 1, for an exclusive villa suburb on part of this area to the north of the present park.

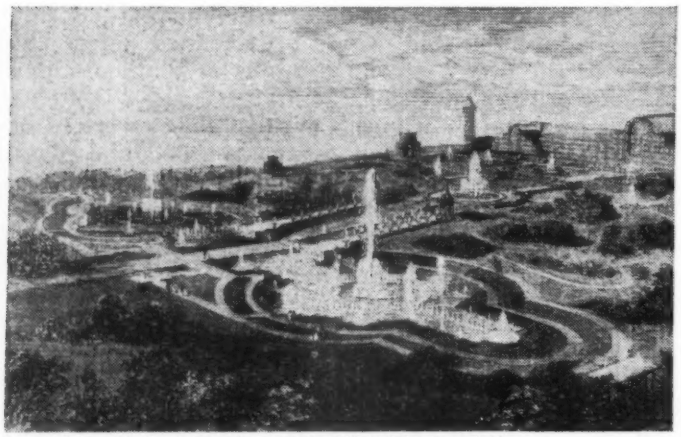
From the first choice of the site it is obvious that the situation of the new Palace as the nucleus of a system of railway lines radiating to all parts was perhaps the most important factor in its location. Paxton the railway pioneer (he was a director of the Midland Railway Company and of several other lines) realized that a great part of the success of the Great Exhibition lay in the profitability of cheap excursions to London from the provinces, and in fact his conviction that the exhibition building should stay in Hyde Park was partly based on the willingness of railway companies to participate in the purchase of the building as a permanent attraction for railway excursions to London. Hence the new Sydenham Crystal Palace was planned to have not only a station almost within the building itself, 'communicating by an exclusive line of rail with the London Bridge and Bricklayers' Arms Stations' but also a line specially promoted as the 'West End and Crystal Palace Railway' to link with Waterloo and Vauxhall Stations. (This latter terminus was just east of Battersea Park, then still being formed, and the line was later extended across the river to the new Victoria terminus in Pimlico, along the line of the Grosvenor Canal.)

The forerunners of both Crystal Palaces were to be found in Paxton's earlier essays in wood and glass, and later wood and iron and glass, at Chatsworth, particularly in the Great Conservatory (1836–41) and the Lily House (1849-50). At Chatsworth, as Francis Thompson points out in his History, the setting of the house had been determined before Paxton's arrival on the scene, with Wyatville's moderate reintroduction of formality on the west front, and only Grillet's cascade and Archer's temple remaining as reminders of London and Wise's vast parterres and the pre-Brownian formality. It seems, therefore, that Paxton's main larger-scale landscape works before the Sydenham Park were his first essays in public parks and suburban layouts: Princes Park, Liverpool (1842), Upton Park, Slough (c. 1842), Birkenhead Park (1844–47), and The Park, Buxton (c. 1852), together with Coventry Cemetery (1845). These are mainly essays in Paxton's version of a style familiar to Repton and Nash: informal landscapes adapted to useful purposes, with interest centring in the intimate, smaller-scale scenery of small lakes and their surrounding tree-planted mounds, and the background of terrace and villa beyond.

At Sydenham Paxton was faced with a new problem: what was the appropriate setting for a glass and iron building, of a style unrecognizable, yet of a colossal size? There was, in fact, no precedent, for at Hyde Park the smaller exhibition building (even so being 1,848 feet long) had settled into the seventeenth-century landscape of Hyde Park aided by the broad expanse of the Serpentine and the broad scale of the open park itself; from contemporary engravings the building seems to have been entirely happy there. At Sydenham the building was taller, and moreover was at the very summit of a steep hill, not enfolded in a tree-besprinkled plain. The three main transepts and the symmetrical nature of the building suggested formality, and Paxton took the obvious, but bold, course of designing its setting as a formal one, terraced like the Italian villa gardens he had seen whilst on the Grand Tour with the Sixth Duke of Devonshire in 1838–39; broad terraces to display the gardener's art, but above all to accommodate the vast crowds who would come to marvel at this new wonder. Moreover, the formal style allowed Paxton to indulge in his favourite effects—the use of water on the grandest scale. Thus Paxton adopted the so-called Italian style, first evolved by Charles Barry twenty-five years earlier, brought to its height in his gardens

at Shrubland (1848) and later to be found at its most debased in the Kensington gardens of the Royal Horticultural Society by Nesfield, Smirke and Fowke (1862).

At Sydenham, 2, a grand stairway from the central transept led down to a terrace immediately adjoining the building, which was furnished with bastions to serve as viewpoints over the whole scene; similar flights led down to this terrace from the north and south transepts. Further stairways continued down-



3, general view of the fountains and grounds, from the Builder *June, 1856.*

wards, 3, across a steep bank to the broad main terrace with its central bandstand, its parterres, pools, fountains, statues, vases, urns and dwarf conifers, fronted by a broad walk along the length of the terrace, with its balustrades and many statues and enclosed on north and south by the arms of the glazed corridors leading to the main building. The axis of the central transept was prolonged by the main walk which led down and across both terraces, and down again by successive flights of stairs towards a circular pool surrounded by sculpture. Two other walks of lesser character sprang from the curving side walks of the ornamented garden on the main terrace and reached the lower level by subsidiary flights, terminating in smaller *rond-points* with central pools and fountains. These led in turn to the central circular pool on the main axis, an axis which was further prolonged right across the park by an avenue of trees towards the later position of the Penge entrance at the eastern extremity.

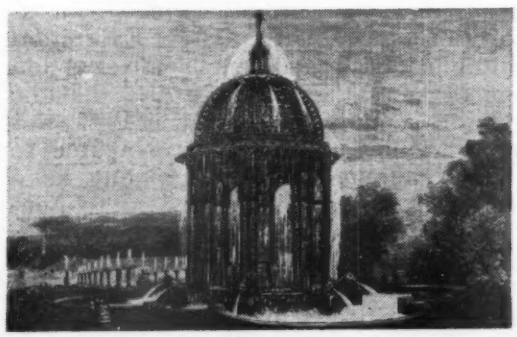
Between the central circular pool and the lower end of the axial walk was the main display of water: a cascade on either hand running down from a temple of glass and iron (derived, no doubt, from the Chatsworth cascade), and falling into two great ornamental basins surrounded by terraced walks and with central fountain jets. The axial pattern was completed by subsidiary circular features, a rosary and a maze, on the subsidiary axes, surrounded by trees which again surrounded the formal lakes at a distance, and gently introduced the gardens into the park below. The park, with its winding walks encircling the whole, encompassed two lakes in Paxton's informal style, upon whose islands were placed the celebrated geological collection where prehistoric monsters were reproduced as casts. These were part of the Crystal Palace's seriously-intended educational programme. Here, too, a party of distinguished scientists once took dinner in the stomach of an iguanadon.

For the architectural embellishments Paxton was indebted to his son-in-law George Henry Stokes (1827–74), who acted as his chief assistant for the whole of the works; Edward Milner assisted with the garden work, and a Mr. Shields was resident engineer for the waterworks. It was perhaps on these waterworks that Paxton lavished most care and forethought —and, too, a good deal of money. There were several fountains inside the building, including the celebrated Crystal Fountain, whilst on the main terrace and below it were nine different basins, including the central circular pool; below this series were the temples, the cascades, and the lower great basins with their central jets throwing to 250 feet. The upper series of fountains was operated daily, but the lower series only at certain times because of the expense.

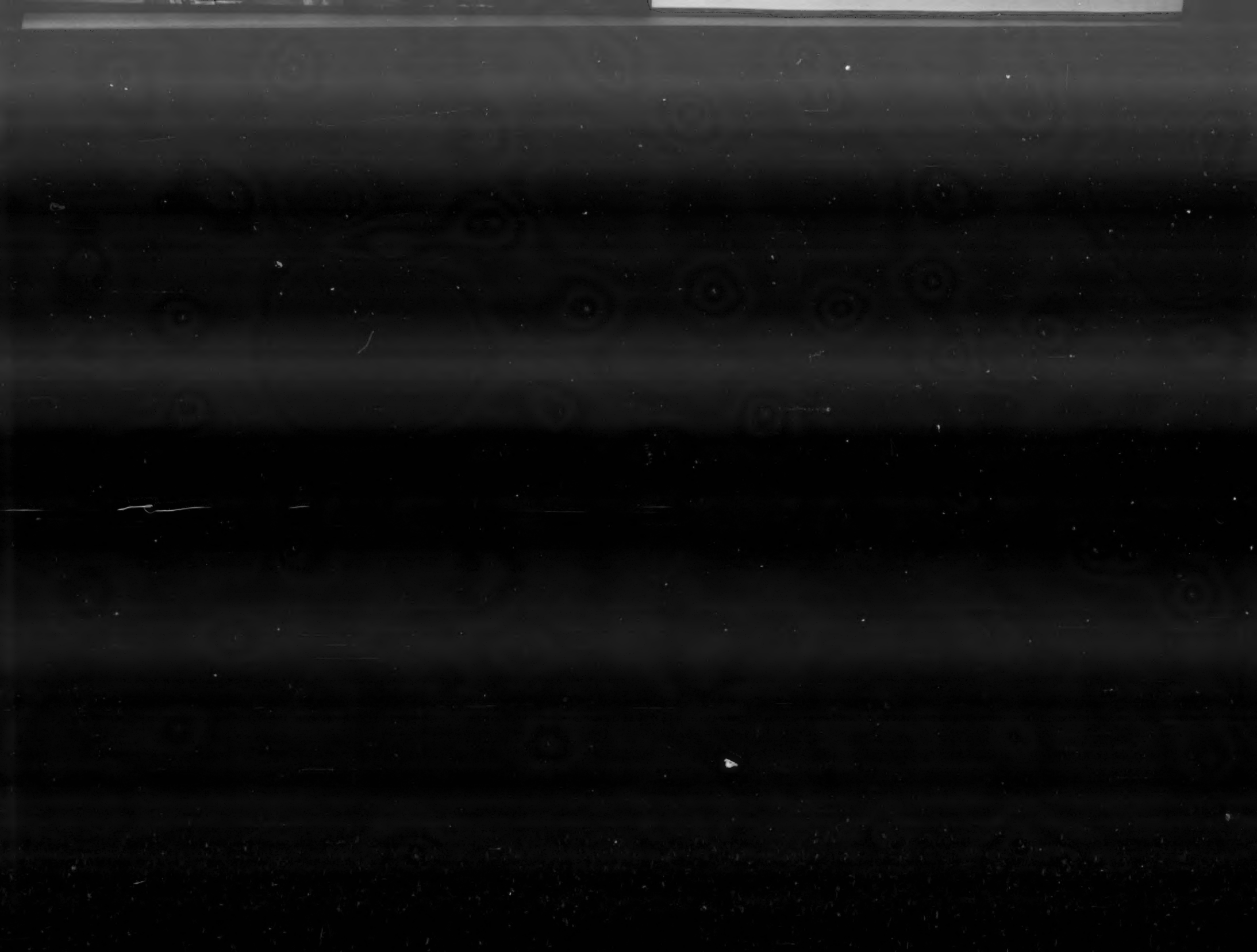
Three levels of water-supply were necessary: in the water towers at each end of the main building, for the great jets; in a lower reservoir at the north of the building for the central jets in the upper series and eight secondary jets in the lower basins; and in the large lake to the north of the park, containing $6\frac{1}{2}$ million gallons of water, for the remainder of the works and for general purposes. These three levels were interconnected by pumping mains, with three pumping stations, the original supply coming from an artesian well 575 feet deep. Even though the full display involved the re-use of the water two or three times in its descent, the display of the 11,788 jets of all sizes meant the use of about 120,000 gallons a minute.

The water temples, 4, were an attempt to combine the new aesthetic of glass and iron with the much older effect of water in motion, and apparently it was only on a calm day that one was able to see 'the glassy films in tinted shades come down the domed temples.' Queen Victoria and her loyal subjects were loud in their approval, however, when these fantastic works were played for the first time on June 18, 1856, 5. The water towers were wonders of another kind, designed by I. K. Brunel, 282 feet high, the tanks being 47 feet in diameter and holding 1,400 gallons of water, supported on twelve cast-iron compound columns around a central chimney shaft, and externally glazed like the Crystal Palace itself. But perhaps the most characteristic feature of the gardens was the flowers, a rich display in their rich setting, and one upon which contemporary journals of all kinds were never tired of commenting: the Crystal Palace and flower-bedding were virtually synonymous, for here was lavished for anyone who chose to pay for entrance

[*continued on page 127*



4, the 'water-bower' or temple and cascade, also from the Builder.



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8

6, *decaying balustrades leading to the upper terrace.* 7, *the overgrown steps of the upper terrace.* 8, *sculpture of Neptune in the centre of the pool at the east end of the park.*

9

11

12

PAXTON AND SYDENHAM PARK

9-12, a selection of the rather desolate-looking sculptures scattered around the park. **13**, *monument to Paxton, at the end of the main axial walk.*

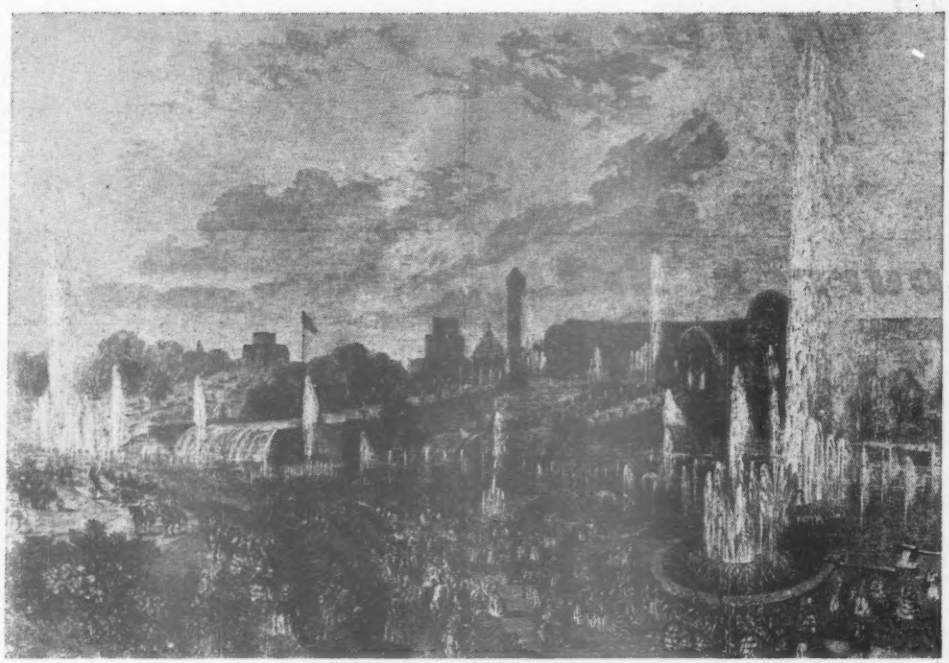
10

13

11

12

13



5, inauguration of the great fountains at Sydenham Park, from the Illustrated London News, *1856.*

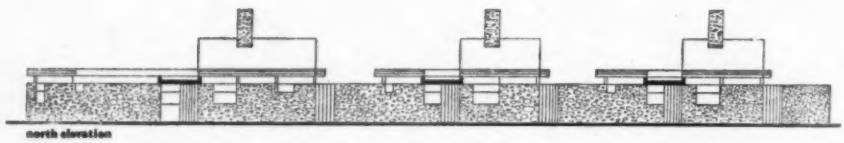
continued from page 124

the same skill (but alas, not the same taste) as that which elsewhere graced the surroundings of a Duke's home; and as taste declined, so the gardens of the Crystal Palace declined; they declined, too, in another way, for £1,350,000 had been expended on the whole project before its completion—more than twice the original capital of the company—and financial difficulties were never absent after the first flush of public enthusiasm had faded.

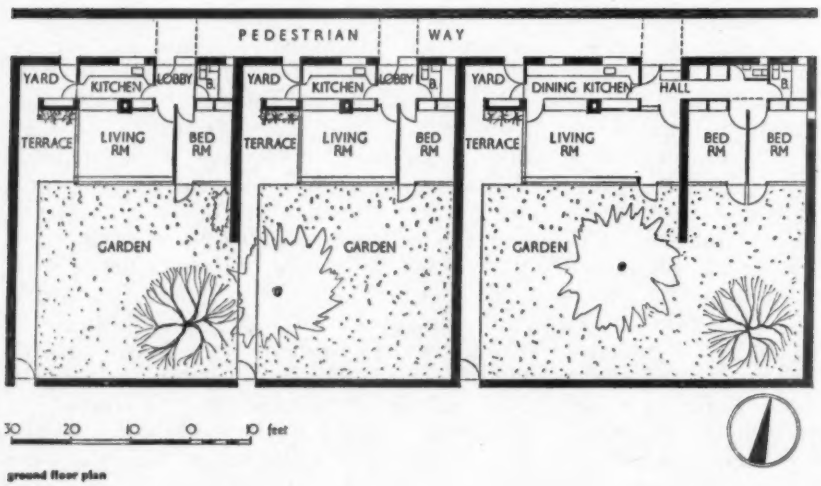
Today the building has vanished completely. The water towers are demolished, the great formal basins filled in, the terraces, 6–12, overgrown and desolate, and the bust of Paxton, 13 (erected by subscription in 1869), stares unseeing at the ruin of his greatest scheme. In the park below, the passage of a century has matured the planting so that one can find, for instance, lush castor-oil plants fifteen feet high amidst the spreading trees. Today's interest in the park extends to motor-racing and football, whilst a general lack of money curbs the twentieth-century pocket from appropriate means of public self-expression.

Paxton's Crystal Palace was, it seems, a failure economically, despite its aesthetic success, but its gardens have been condemned ever since William Robinson first published his *English Flower Garden* in 1883. They, more than the building perhaps, are representative of their period, a time when, in the art of the garden, the gardenesque style first solemnly propounded by Loudon on a botanical basis, had come to fruition as an ornamented eclecticism in which debased aesthetic values and enhanced horticultural skill were partners. Perhaps at Sydenham this was to a large part due to the scale of the gardens: a scale not only dwarfing man, but even more dwarfing the small but gaudy plant material embellishing foreground and middle distance alike. Here the whole park became garden, and although Paxton elsewhere acknowledged the necessity of not intruding the small, detailed scale of the garden into the larger landscape (in 1859, for instance, he strongly objected in the House of Commons to the 'gardenizing' of Hyde Park by the Commissioners of Works) it seems that he was not aware of this great defect at Sydenham. Afterwards, in his other public parks and his gardens for large houses, he was more restrained, relying more upon a return to the style he had so successfully used at Birkenhead and elsewhere for his main effect. The park at Mentmore, for example, is in the Reptonian tradition, with a reasonable minimum of formality near the house, a house which is an ingenious adaptation of Wollaton Hall, Nottingham. In his later public parks nevertheless (for example, The People's Park, Halifax, 1857) a formal terrace is often found as a focus to the park landscape.

To the question of whether one ought to try to retain the Sydenham Park in its present state it seems that there is only one answer possible. This landscape, the *raison d'être* of which has been gone these twenty years, was at best an unsatisfactory one, for the problem presented by the huge building in this setting is difficult of solution today—a fact which the proposals for a new exhibition centre put forward five years ago seem to demonstrate. Paxton's memorial lies in those urban parks of which he was a pioneer, in a handful of country houses, in some aspects of London which we now take for granted (his work in the sphere of Metropolitan Improvements is noteworthy but unhonoured), and, above all, in parts of the setting of Chatsworth which still bring him freshly to mind. It would be ungrateful not to have the suggested memorial garden at Sydenham, but the terraces there, with their ponderous searching for culture, are clearly at variance with the twentieth-century apparatus for disseminating what is taken to be the same thing today. Clearly, the whole site should await redevelopment, but with the moral of the old Crystal Palace present is it wise to build a new one? Or should not a reconsideration of the future of this fine, once highly accessible site take place? With two railway stations on the spot, seven more within half a mile of the grounds, a major bus terminus at hand, and Gatwick airport just down the line, surely this is an ideal site for a new major suburban centre: a first stage of offices and shops (the terraces lending themselves to a solution of the parking and servicing problem), and a second stage of entertainment and recreational uses supported financially by the return from the commercial part of the complex if need be? This would still leave the major part of the site intact for other recreational uses, including the National Sports Centre presently building, and it would make a sizeable contribution to the LCC's effort to divert a new office building from the centre of London.



north elevation



ground floor plan

HOUSES, SWINDON

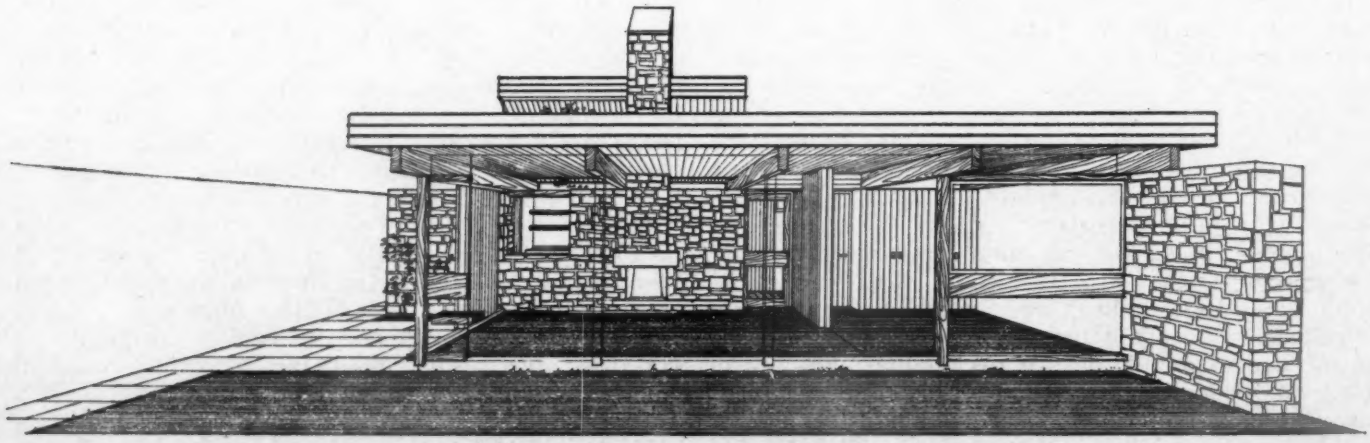
ARCHITECTS, POWELL AND MOYA

A group of three staff houses in the north-east corner of the grounds of the Princess Margaret Hospital, Swindon, by the same architects (illustrated, AR February, 1960). One, a two-bedroom house, is for the deputy matron. The others are one-bedroom houses for resident married medical officers. They are about 200 yards from the hospital buildings.

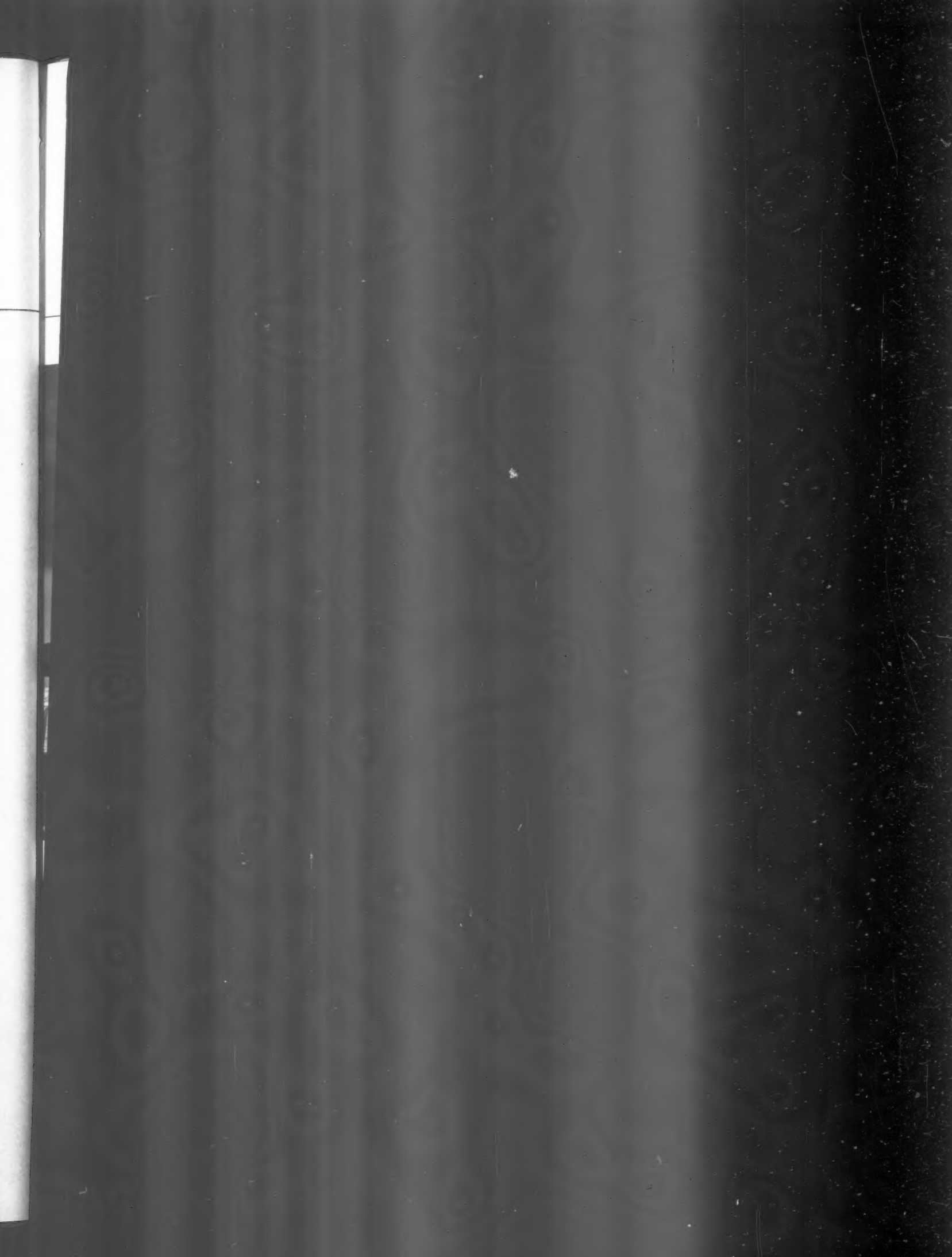
The houses are single-storey, grouped within a walled enclosure to give them privacy—they have no views outside the site—but planned so that they also have privacy one from another. To link their design with that of the hospital, their solid walling is of the same local stone as is used for retaining walls, plinths, etc., in the hospital. In all other respects the houses aim to create an atmosphere as different as possible from that of the hospital.

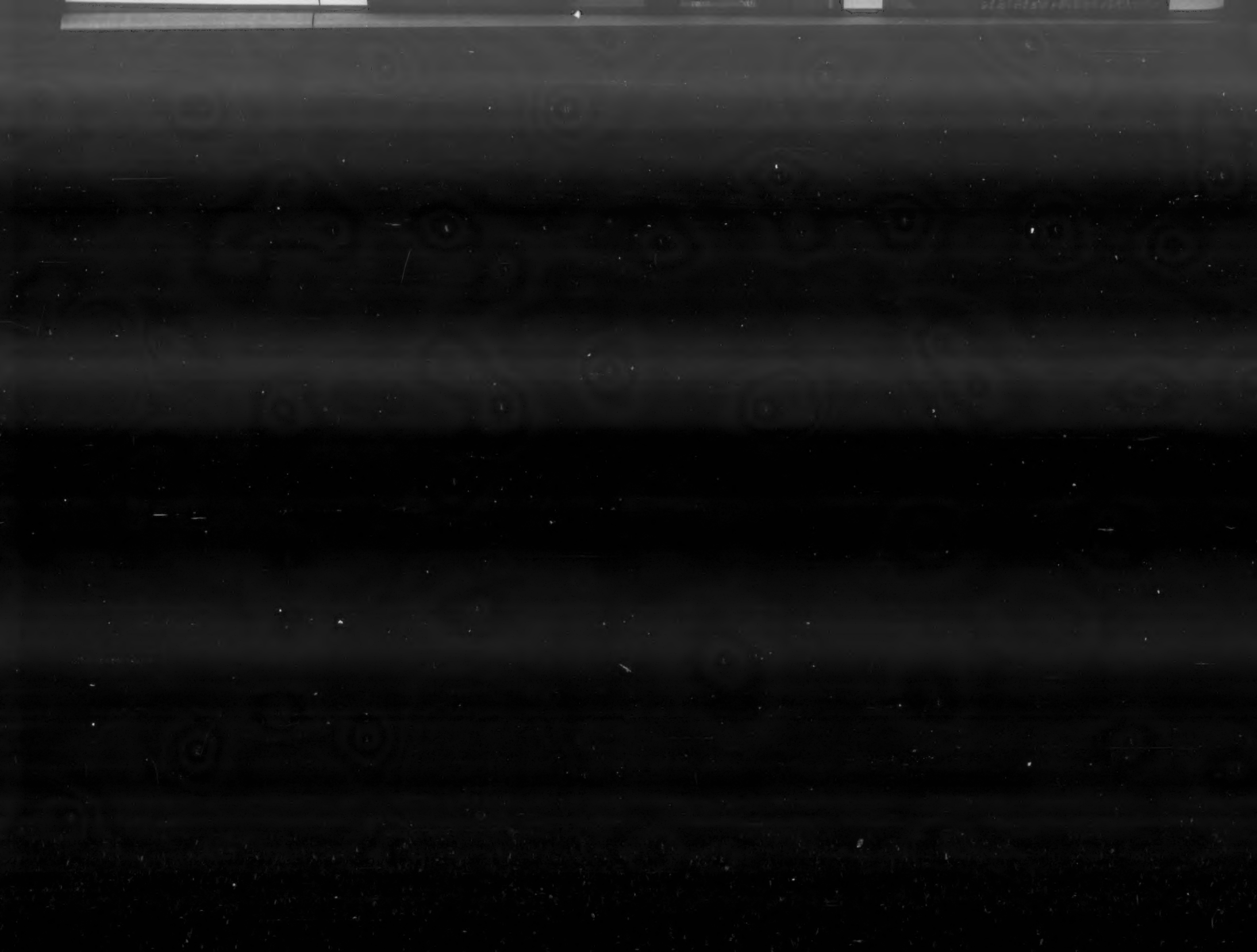
The stonework forms the outer leaf of a 15 in. cavity wall, the inner leaf being clinker blocks. The glazed south walls are framed in Oregon pine with posts at 6 ft. 6 in. centres. The roofs are also Oregon pine, boarded, insulated with wood wool and covered with felt and grey granite chippings. The sloping kitchen roofs are covered with cedar shingles. Fascias are of Western red cedar. The chimneys are capped with slate. All timber is left natural. Metal window opening lights are painted black. These (and the smaller opening lights, which are of wood) are set in wood sub-frames.

Assistant architects, Paul Koralek and Richard Burton.



1, cut-away perspective from the garden, looking into the living room on the left and the bedroom on the right.





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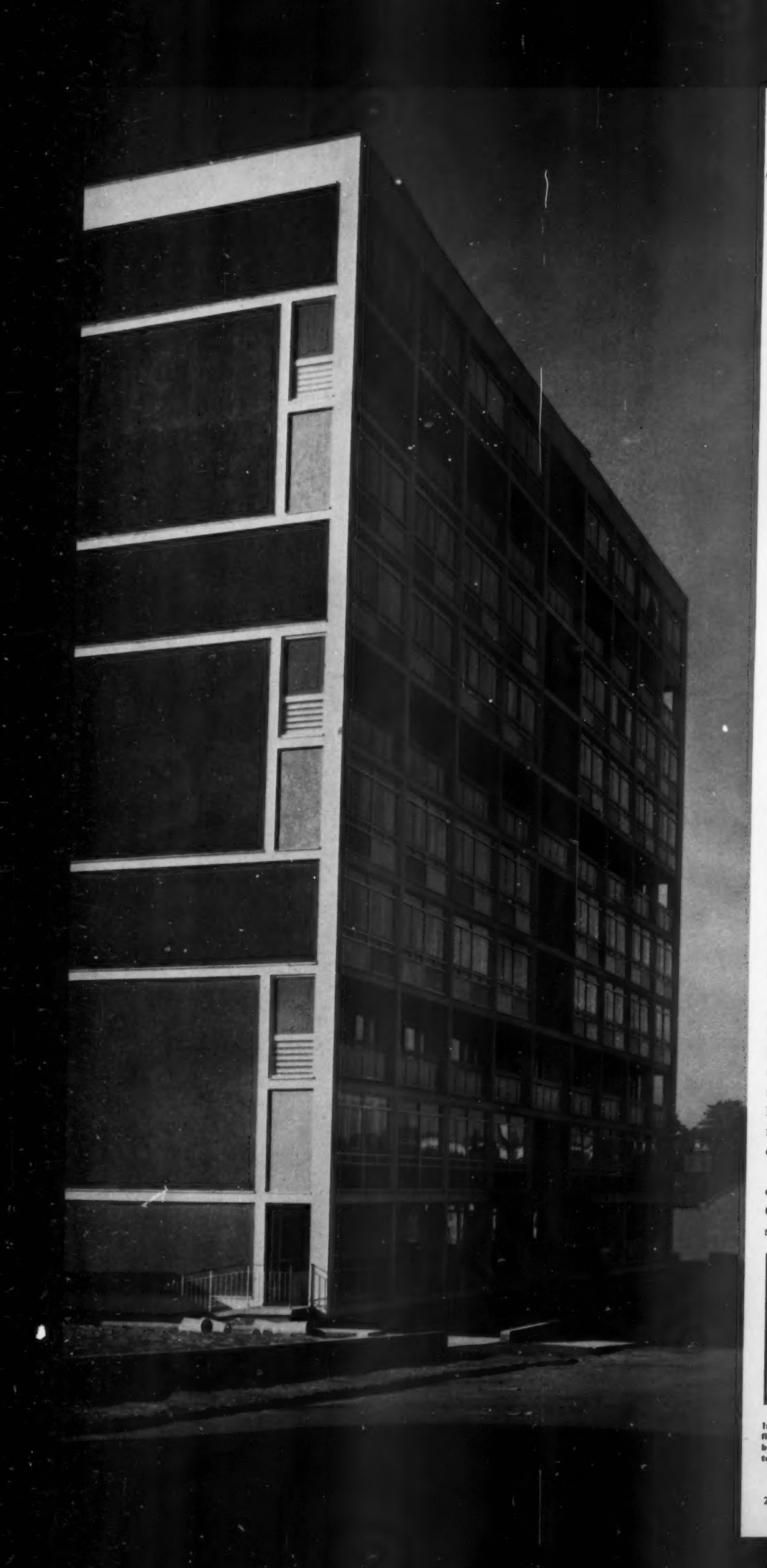
2, the garden elevation from the south-east; 3, looking north-east; 4, the pedestrian way with entrances off; 5, inside one of the kitchens, looking through to the lobby.

3 4 5



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7

6, access balcony elevation; 7, distant view.

FLATS, COVENTRY

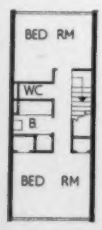
ARCHITECT, ARTHUR LING (CITY ARCHITECT)

A 10-storey block, known as Phœnix House, in Queen Street, Hillfields, part of a redevelopment scheme in one of the city's older central areas. It is the first of five similar blocks. They were previewed in the AR January, 1959.

The problem was to design a block containing a mixture of maisonettes and flats suitable for the Queen Street site but adaptable to other sites in the redevelopment areas. There are 56 dwellings in the block: 24 two-bedroom maisonettes, 24 two-bedroom flats and 8 one-bedroom flats. The central staircase and lifts give access to maisonettes from balconies at second, fifth and eighth floor levels and to flats by staircase from each of these levels. The same stair-well is used for the internal staircases of the maisonettes. Stores for the flats are on intermediate floors within the central tower; the maisonettes have larger stores at lower ground floor level.

Construction is reinforced concrete with no-fines concrete infill panels as party walls. The external frame is faced with precast concrete cladding units. Gable walls have an applied black aggregate finish. All windows are sliding. The panels below them are vitreous enamelled steel. Living-rooms have electric floor-heating. The kitchens of one-bedroom flats and all bathrooms are mechanically ventilated. There are refuse chutes, and each dwelling is provided with a spin-dryer.

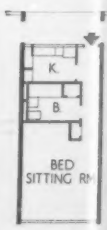
Principal housing architect, Gwyn Morris. Architect in charge, Ceri Griffiths. Quantity surveyor, R. F. Lear. Consulting engineer, Granville Berry (city engineer and surveyor).



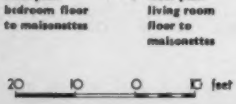
1st, 4th, 7th floor plan bedroom floor to maisonettes

2nd, 5th, 8th, floor plan living room floor to maisonettes

3rd, 6th, 9th floor plan 1-bedroom flat

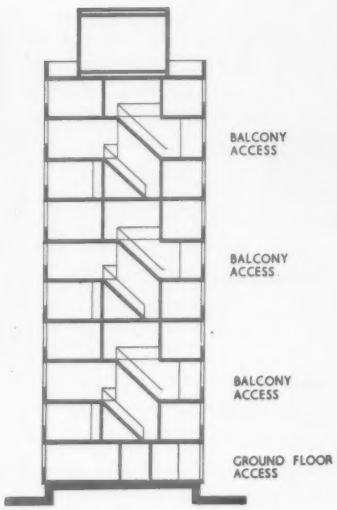


ground floor plan bed-sitting room flat



8 9

Flats at Coventry: 8, *private balconies off living rooms;* 9, *looking along an access balcony.*



cross section

10, *entrance to the factory;* 11, *close-up of monitor roof of production area.*

10

11

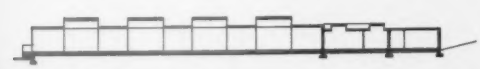
FACTORY, HAVERHILL, SUFFOLK

ARCHITECT, HUBERT BENNETT (ARCHITECT TO THE LONDON COUNTY COUNCIL)

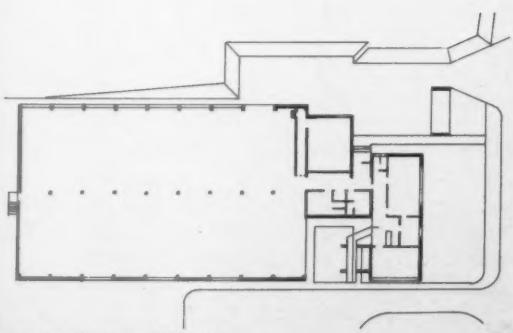
Designed for the Haverhill urban district council where the LCC has been building new housing neighbourhoods under the Town Development Act—see AR preview issue, January, 1960.

The factory is for a firm producing radio and electronic components. It has an area of 8,000 sq. ft. which can be doubled by extension northwards after removal of the rendered rear wall. Research to find an economical structure that would give good internal lighting produced the system of monitor lights with timber trusses at 13 ft. 4 in. centres, spanning 35 ft. on to a central row of laminated timber columns. The flat roof has timber joists. Outer walls are brick.

Senior architect, General Division, David Jenkins. Assistant architect, P. E. Jones. Section architect, Henry White. Job architects, John Milnes and Brian Thaxton. Senior structural engineer, LCC, J. H. Humphreys.



long section



ground floor plan [scale: 1/64in. = 1ft.]

EXHIBITIONS

PAINTING

During his lifetime, Wilson Steer's enormous reputation in this country was based on the work in which he deliberately rejected French impressionism. That reputation has waned to the point of extinction and has been replaced by one more firmly based on the spontaneous impressionism of his early beach scenes. But the Arts Council exhibition which commemorates the centenary of Steer's birth, and is now touring the provinces, has been treated by Andrew Forge, who chose the pictures, as a salvage operation, designed to retrieve some of the pictures which went down with Steer's first reputation.

Forge has produced a well-balanced retrospective. He has certainly not been tempted to place undue emphasis upon the early beach scenes and seapieces, and in the Tate hanging he did his best to prevent them from banding together against the rest of the show by putting some of the more stolid interiors of the same period at strategic points. In fact, he created the best possible atmosphere in which to present his contention that it is by his paintings of the period 1905–15 that Steer must finally be judged. This period starts ten years after Steer had turned his back on the beach scenes, and Forge says that by this time 'he had absorbed the lessons of the landscape masters and was working from within them with great personal freedom.'

I can only think that Forge has persuaded himself that these sombrely strenuous and undoubtedly brilliant exercises in the manner of Constable and sometimes of Turner display more moral fibre than the insouciant-looking beach scenes which still vibrate with light, colour, movement and the absurdly wonderful spectacle of growing girls. Yet oddly enough, he blames Steer's friends for leading him into retrograde and chauvinistic practices whilst praising the very pictures which disclose them.

He has clearly devoted much time to the study of Steer and his circle, and I feel that he probably has ideas about the cause of Steer's failure of nerve that might make his sympathy for him appear more reasonable. The aesthetic defence simply doesn't work. There must have been a profound psychological disturbance of some kind to account for the abrupt

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change in his work that took place in 1895. Forge himself has admirably described the change: 'He turns from the fresh astringent light of the seaside to the gold and shadow of wooded landscape . . . from the shocks of unpredictable patterns to the familiar rhythms of what Sickert called the "August Site" '. But it's no sort of explanation of the change to say that Steer 'dreaded notoriety, conflict and adventure,' for we have the evidence of the Walberswick pictures that for a time he welcomed adventure with open arms.

One thing that was curiously evident in the exhibition was Steer's failure to find a means of using the flat colour areas and animated drawing of the seaside pictures in his indoor paintings. The painting called 'The Blue Dress,' 1, for instance, is handsome enough in its way, but looks sedate and orthodox beside the painting of girls on Walberswick Pier, 2. It's involved in a totally different set of sentiments and pictorial procedures. The Walberswick picture is magically saturated in intimations of the future, and seems even faintly to predict Munch's picture of three girls on a bridge and the mysteries of late afternoon in the early Chirico.

One of Germany's leading painters, Ernst Wilhelm Nay, has, at the age of fifty-eight, been given his first one-man show in London. Exactly half the oils in the exhibition at the New London Gallery were devoted to a small retrospective of pictures painted between 1934 and 1955. The sense of restlessness conveyed by the

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inordinately rapid series of stylistic changes was no doubt due in part to the desire of the selectors to show as many aspects of his development as possible with a minimum of canvases, for the other half of the exhibition is devoted entirely to works painted during the last two years. Their impact is so much more impressive than that of the retrospective group that it suggests—dramatically, but perhaps unfairly—that the painter has suddenly made what used to be called 'a dialectical leap' and found the solution to his problems. All the paintings done in 1959 and 1960 had a strong family resemblance, and some of them are among the best examples of abstract expressionism I have seen, 3. This is an exasperatingly ill-fitting term when used as a general cover for American *avant-garde* painting, but it aptly describes Nay's recent work, which is an abstract version of early twentieth-century German expressionism.

Several critics have noted the resemblance to the expressionism of Nolde. In some of the paintings the resemblance is so strong that one tends to read the large circular swirls of paint as faceless masks. But the high visibility of Nay's paint-marks, and the variety of gestures with which they are formed, are expressive of a greater range of emotions than the grimaces in Nolde's work. The fixed facial expressions have always seemed to me to be a gross caricature of the emotions which dictated Nolde's forceful brushwork and burning colour. Although it comes and goes, Nay has a sense of the quantitative differences that produce an even chromatic vibration from the juxtaposition of several colours, and when this faculty is in full play the brutality of the gestures and the voluptuous thickness of the paint are subsumed in a massive serenity.

Nay must have had the same sort of experience when looking at Nolde that Hans Hartung had when he first saw Franz Marc's 'The Fate of Animals.' Hartung was still a student in Dresden at the time, and he has recalled that, although he was deeply moved by the rhythmically recurring compartments of colour in which the animals were contained, the animals irritated him. 'I would have suppressed them,' he says, 'because they seemed to me to hinder the free development of the painting.' Just as the grinning and snarling masks in Nolde's paintings caricature his sense of the desperation of the human condition, so Marc's attitude to animals sentimentalizes his lyricism. One will not find a correspondence between Marc and Hartung as obvious as that which Nay has established with Nolde, but Hartung's abstracts are lyrical rather than expressionist. His art is cooler and less demonstrative than Nay's, and he has

4

been in command of his style for a much longer period.

A group of compositions in charcoal and pastel, executed during the last two years, formed the core of Hartung's latest exhibition at Gimpel's. They represent another step in the reduction of gesture which has marked his development. It has always seemed to me that his art has a gothic and hermetic character, as if he were using his black signs as some sort of magic prescription against the temptations of an infinity of light. These signs have gradually been shedding their resemblance to a secret language without losing the look of having a talismanic function, and are now limited to bundles of vertical incurving lines in which a few strokes of colour diversify the prevailing blackness, 4. In their context, these occasional strokes of red or yellow or green are like a glimpse of the light lapping against the other side of the lines. It is a curious art, and in spite of its elegance and decorative refinement has always managed to convince me that there is a vast and frightening something or other on the far side of the linear fence.

By comparison with Hartung's work, the gothic character of Lyonel Feininger's art is obvious, and almost naively expressed. Feininger was born in the United States of German parents and lived in New York until he was sixteen. Afterwards he spent many years in Germany. He exhibited with the Blaue Reiter group and became a teacher at the Bauhaus in Weimar and Dessau. He died in New York in 1956 at the age of eighty-five. The Memorial Exhibition of his work, which was organized in the US and came to York Art Gallery and the Arts Council Gallery before going on to Hamburg and

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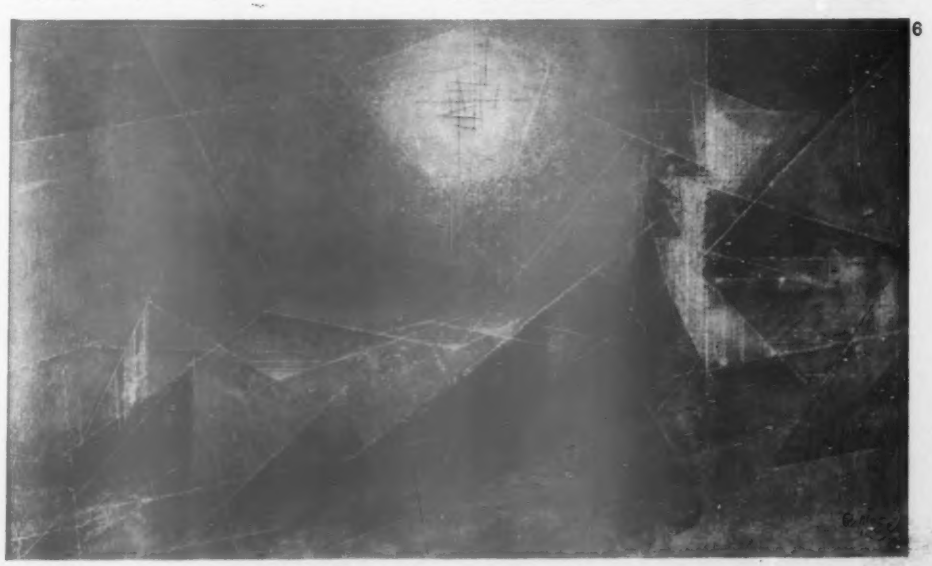

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other German cities, was a worthy tribute to an artist who made a highly personal, highly gothic use of analytical cubism. The charm of his early architectural compositions has not been rubbed off by the years. The feeling for an intricate all-over design that made him pleat his skies to conform with the angularities of his buildings, 5, is still persuasive, and the tilting buildings with their perilous-looking approaches remain the plausible haunts of alchemists and dabblers in black magic. In his later work he attempted to catch the vast skies and waters of America in his linear trap, and the result is quietly nightmarish, as if he were trying to tie up light and space with a ball of string, 6.

The latest of the annual mixed exhibitions in which Tooths show their most important new acquisitions included one of Monet's fifteen paintings of haystacks and a Degas racecourse which they acquired in bad condition and in which the figure of a woman has recently emerged from a blur in the foreground. Among the lesser lights was a typically deliquescent female figure by Pascin, delicately

7

adumbrated in a sick line like the chart of a fever, 7.

McRoberts and Turnard, who are perhaps pursuing a geographical policy, have followed up their exhibition of the Italian *avant-garde* painter Fontana with the politically slanted realism of Renato Guttuso. Guttuso's work is primarily of interest as an attempt—like John Berger's art criticism—to make the heroics of socialist realism palatable on this side of the iron curtain. Their strategy is to put up a show of sensitiveness to what they consider to be the salvable aspects of the decadent twentieth-century art of a corrupt bourgeois society, and in Guttuso's case the result is a kind of cubistic, extrovert Van-Goghism calculated to appeal to people who like their Victoriana to be modernistic.

His latest show was cleverly verbalized by Richard Wollheim to ensure that its special brand of Marxist 'liberalism' was thoroughly communicated. He says of the large collage-painting which dominated the exhibition, 8, that it depicts men of different beliefs arguing 'heatedly about

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how the necessities of life should be distributed,' and since he probably obtained this information from the artist we must take his word for it. He adds, however, that Guttuso has revived (!) the art of collage in order to 'accentuate the physicality of the painting,' but in fact Guttuso has used it as a faintly disguised abstract element to create a spatial ambiguity and run a stream of 'thought' through the beefy realism. This is doctored nineteenth-century anecdotalism, and I prefer the real thing.

I prefer for instance the unpretentious little Victorian painting by an unknown artist which was included in a recent exhibition of 'paintings of sentiment' at the Jeffress Gallery, 9. It *reeks* of sentiment and yet there is no overstatement of the case. It is quite devoid of anything that could be called a pictorial value, but its mercilessly commonplace details add up to a kind of truthfulness. Those stubby

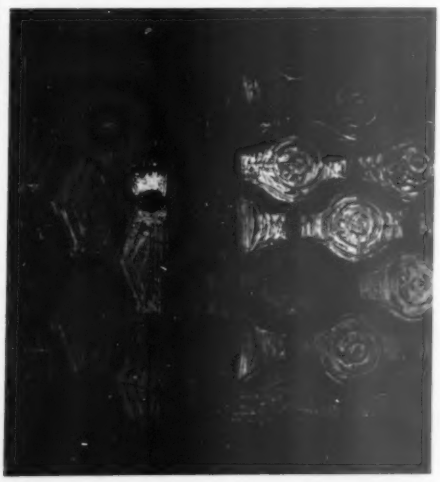
9

little black shoes seem to me to accuse Guttuso's wrinkled suit and crumpled newspaper of false rhetoric.

Robert Melville

SOURCES OF THE TWENTIETH CENTURY

The crux with last year's Romantic exhibition of the Council of Europe was, as everyone now agrees, that no unity of theme was achieved. The exhibition ought to have told us what Romantic art is, and it did not. It showed us splendid Delacroixs, Friedrichs and Constables and doubtfully romantic Davids and left it at that. In Paris, in the present Council of



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Europe exhibition, which opened in November, the cleavage is even more conspicuous; but through no fault of the organizers. One enters through one of Guimard's Métro arches, all flamboyant Art Nouveau iron, has then on the right Rodin's *Balzac* and a photo of the Eiffel Tower under construction, and so reaches Seurat's *Le Cirque* and the Pélerin *Bathers* by Cézanne.

This introduction is a challenge, but there is no response. All the rest is divided, and architecture is on its own at the end of the circuit, an interesting, somewhat tricky chronological display with such unexpected details as the glass wall of Guimard's Castel Berenger, 1, or the roofscape of Mackintosh's Art School. Decoration, design and furnishings have two large rooms to themselves adjoining the Nabis, the Fauves and the Brücke. The large rooms are arranged so that one of them—thanks to the British Council playing their hand skilfully from the very beginning—is entirely British, whereas the other is given to all other nations and shows their work in no special order, national or otherwise. Also, the British section, with, as its centre, a large free-standing Mackintosh display specially designed by Nigel Walters, and with a good supply of

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3

Mackmurdo, Voysey, Ashbee and the others, does look a source of the twentieth century; the Continental room looks by and large a glorious freak, connected with the present only in so far as the present is Neo-Liberty. The contrast is forced home from the very first moment, by the British room being light, the Continental room dark; and the impression of a total contrast between Art Nouveau and the Arts and Crafts (with Mackintosh in a most fruitful middle position) remains, even when one has discovered such rewarding objects as Gaudí's furniture (one seat on metal supports for instance, 2), Gallé vases, Riemerschmid's machine-produced table glass, or Bindesböll's wholly twentieth-century looking plates.

There are discoveries also on the painting side, though of course fewer, as the field has been well ploughed for thirty years and more. My own greatest surprise was Leon Spilliaert (1881–1946) with his small, yet poster-like gouaches, especially the girls with white stockings of 1912, 3. Poster-like also is Vuillard's mysterious *Au Lit* of 1891, where a girl lies in bed, the bedclothes forming a simple geometrical form and a capital T appears above her head for no obvious reason. This must be the very beginning of that kind of use of typographical elements which the early cubists were going to make. The effect is distinctly reminiscent of the posters of the 1890s, and for Continental visitors the enormous posters of the Beggarstaff Brothers, which are specially similar in principle, appear something of a discovery. They are certainly the best in the show, and a fine preparation for the British room on the threshold of which they hang.

That Munch belongs to Art Nouveau is by now accepted. His is to me the finest single representation in the exhibition. Gauguin ought to have had the same impact. But it seems to have been impossible to obtain what would have tied him most firmly to decoration, perhaps a relief of the *Soyez-amoureuses* type and a painting with Art Nouveau curves such as the Tahitian with the Axe of 1891. Emile Bernard also could have been shown as a link between painting and the crafts, e.g. one of his tapestries of 1888 or the carved cupboard doors.

But everyone knows how hard it is to obtain for such an exhibition exactly what is needed. Gaps are in fact few (Toorop is another) and the aesthetic quality of what is shown is universally high. Some nations, notably Italy and Belgium, have sent too much of a kind that no one could call sources of the twentieth century. Britain has been wise in that respect. Two Nabi'ish Steers, two Sickerts, and then just a little of Vorticism; that is pretty well all. Epstein's *Rock Drill*, illustrated on the frontispiece of the December AR, is the only piece of European calibre. He never succeeded to that degree again.

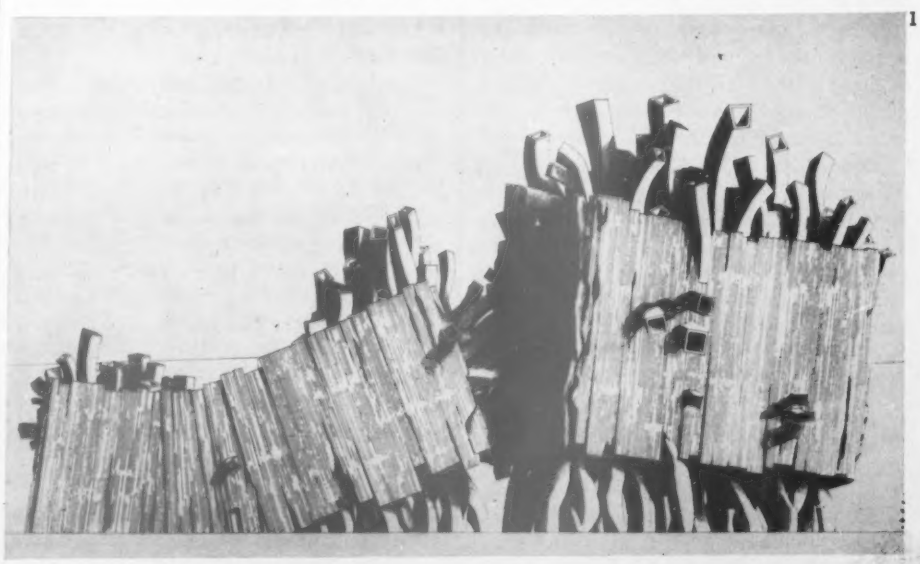
Should one perhaps have shown some Omega stuff? It might have been wise. Apparently no other country has anything quite like it, and it would have established the only link between Cubism or Abstract Art and furniture, even if a tenuous link. What the exhibition proves is that furniture made, not only painted, to correspond with the trends towards abstraction in the Fine Arts did not appear until a few years after 1914—the terminating year of the exhibition—that is, with Rietveld's celebrated chair of 1917.

N. Pevsner

ARCHITECTURE

BEYOND BRUTALISM

If not from the mouths of babes, then from the drawing-boards of students come the warnings of the ultimate ends of architectural tendencies left to run unchecked. The project, 1 (and cover of this issue) for an extension to the public library in Melbourne conceived by a second year student, Jason Pickford, at Melbourne Technical College is 'obviously impossible' (Pickford failed to produce a plan for it) but not, as some might be tempted to say 'obvious nonsense.' How far does it go beyond the most extreme cases illustrated in James Gowan's article on architectural education (AR December, 1959)? How far do the window tubes go beyond those of Le Corbusier's Chapel at La Tourette? What degree of difference separates this from some of the shaggier,



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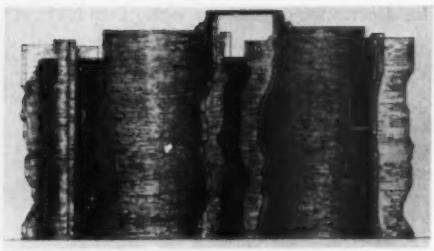
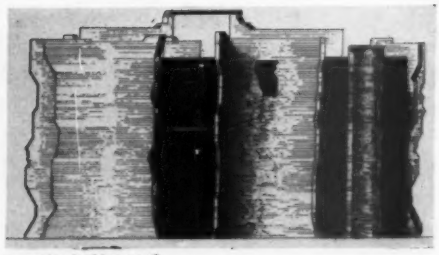
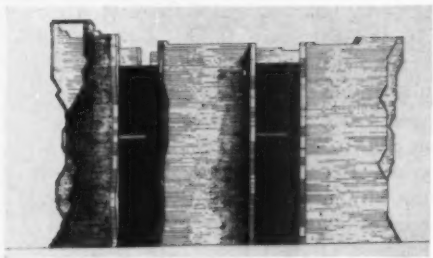


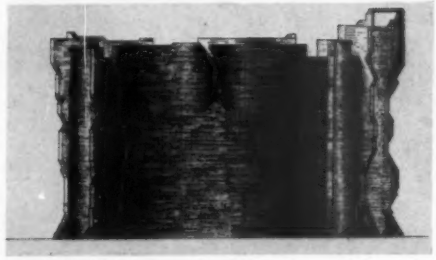
2, *section looking south.*



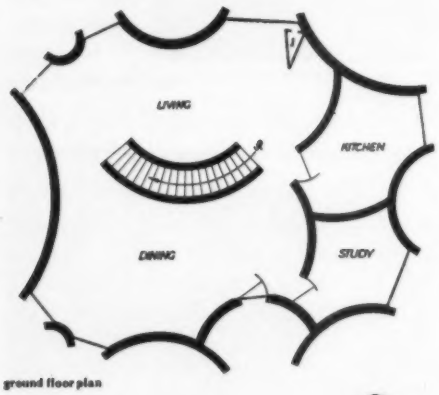
3, *section looking north.*



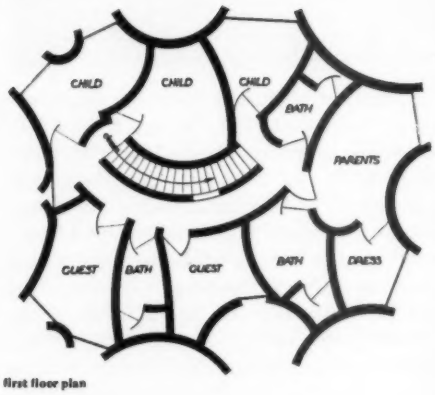
4, *section looking east.*



5, *section looking west.*



ground floor plan

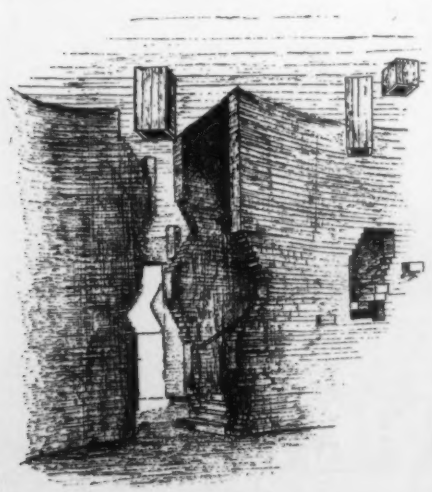


first floor plan

hyper-brutalist projects being mulled over in the US or Japan?

In any case, it is not an isolated *jeu d'esprit*, but the second generation of a spate of projects brought on by an earlier second-year design subject—a house on a specified site for a minutely described family, and otherwise no holds barred. For this, Pickford produced a design in which the house, 2–5, is the left space between a number of intersecting cylinders (see the plans), the remaining parts of the brick cylinders having apparently been ruined or never built—an ambiguity that connects it with a respectable family tree of pseudo ruins, and—in particular—the Desert de Retz (AR November, 1949).

A study of the plan will reveal a lay-out that is far from obviously impossible even if the interiors, 6, inspire no immediate confidence. Yet we have already learned to live with fairface brick (even fairface flint!) and have a stock of Regency expertise in putting square furniture into rooms with curved walls. This *could* be a workable house; one wonders by how narrow a margin Pickford failed to make a plan for his library; and one therefore wonders whether these are really the ultimate ends of trends, whether there may not be a way beyond Brutalism. Even if there is not, and Pickford is not a real recruit to serious ultra-*avant-garde* architecture, we still appear to have gained a remarkable draughtsman. Q.S.C.



6

HATS OFF

PEDESTRIANS ONLY

There is much talk about restoring pedestrian pre-eminence in city streets—especially shopping streets—but not much action is taken, such is the domination the motor-car has achieved over the whole life of modern cities. There is, of course, Coventry's shopping centre and there are pedestrian centres in the new towns, but these are new designs; existing shopping streets in city centres present a more difficult but urgent problem, and little progress has been made in Britain with disentangling the pedestrian from the motor-car in places like these. Even the proposal to bar the High at Oxford to through motor-traffic seems little nearer realization than when it was first put forward twelve years ago.

On the American continent some promising, if tentative, experiments have been made. The temporary conversion of a main down-town street in Toledo, Ohio, into a pedestrian mall was reported and illustrated in the AR for November, 1959,* and at Kalamazoo, Michigan, a somewhat decayed street was converted into a shopping mall in August, 1959, and as a result of its popularity it is now being lined with new buildings. Similar experiments have been made in Germany—at Essen and Kiel—and in at least two cities in the Argentine, Buenos Aires and Cordoba, main shopping streets are—as a permanent arrangement—restricted to pedestrians from 10 a.m. onwards. Cologne, Germany, has streets with a similar restriction. This is a precedent that could well be followed in congested British cities, in streets where it would be impracticable to bar motor-traffic during the rush-hour as well.

Still another experiment—similar to that at Toledo—has recently taken place

* Though there is no news of the conversion, which took place in August 1959 for a trial period of 45 days, being made permanent.

1

at Ottawa, Canada, and is the subject of this month's frontispiece, page 84. An important busy central street—Sparks Street—was temporarily transformed last May into a shopping mall. Wheeled traffic was barred although, since the shops had no back access, goods vehicles were allowed to enter the street for short periods in the early morning and late evening. The road was resurfaced, the two points in the half-mile length of the street where traffic cut across it being painted in black and white stripes. Fifty trees (between 20 and 25 ft. high) were placed along it in tubs. Fibre-glass seats were provided, together with flower-beds, pools and fountains, a children's playground and a tourist information kiosk, 1. Two side-walk cafés were railed off by hedges and protected by awnings, 2.

This project, which Ottawa owed to the initiative of the shopkeepers in the street, was continued as an experiment until October. Then it reverted to use by motor-traffic, 3, with a renewal of all the conflicts this involves (note the imminent accident in the bottom left-hand corner). But a research committee is studying the results of the experiment and, following this committee's report, a decision will be taken about making the project permanent. Apart from the welcome given to it by the public, there is hope in the fact that the closure of Sparks Street to wheeled traffic also forms part of the very enlightened civic design proposals now being put forward by the National Capital Commission.

J.M.R.

2

3

HISTORY

THE 'PAXTON' PAVILIONS AT SHEFFIELD

The three stone-built glass-roofed pavilions, attributed to Joseph Paxton and called by his name, which stand in the Botanical Gardens at Sheffield, have recently been thoroughly restored by the city architect, Mr. Lewis Womersley, under whose care they came when the gardens were transferred to Sheffield Corporation in 1957. This account of them can be regarded as a pendant to Dr. Chadwick's article on pages 123–127.

A good description of the pavilions is to be found in the *Floricultural Magazine* (Vol. 1, 1837) published by Robert Marnock, the first Curator of the Sheffield Botanical Gardens.

'Between the grand entrance just described and the residence of the Curator, extends along the upper part of the gardens the magnificent range of Conservatories . . . The entire line of frontage is 100 yards; but the extensive and beautiful structure itself, is divided . . . into five parts, the narrowest of which is 24 ft. in width. The terminating buildings as well as that in the centre, form noble and commodious Greenhouses, the enclosed portions being built in front of rubbed stone, and having pairs of Corinthian pillars alternating with the vertical sashes. Each of these houses is covered by a quadrangular glazed dome, constructed of metallic ribs, connected and surmounted in the centre with an ornamental casting. The two intermediate portions of the pile, occupying each an extent of 30 yards, are of somewhat less elevation: the glazed roofs are arranged in low parallel ridges, supported and strengthened by cast-iron trusses and pillars. The first Greenhouse that was built on this principle was erected in the gardens of His Grace the Duke of Devonshire, designed and completed under the zealous and skilful superintendence of Mr. Paxton. There are, of course, connected with these Conservatories the requisite forcing-houses and other usual conveniences.

'The whole of the buildings are allowed to reflect the highest credit on the professional taste and skill of our townsman, Mr. B. B. Taylor, the Architect.'

It has not been easy to establish how actively Paxton was in fact concerned with their design, but investigation shows that, whilst he designed neither the Botanical Gardens nor the pavilions, he was directly involved in a different but important way. A copy of the printed *Report of the Committee of the Sheffield Botanical and Horticultural Society* of July 14, 1834 (preserved in the *Sheffield Collection* of the Sheffield City Libraries) throws some light on Paxton's connection with them.

'The Committee, having advertised for plans for the outlay of the gardens, and offered premiums of £10 and £5 for the best and second best, and having received a variety of considerable merit, were favoured by the assistance of Messrs. Paxton, Harrison, Walker, Wilson and Cooper, well-known practical gardeners, and decided upon their merit, when to the satisfaction of the Committee, the plan of the Curator, Mr. Marnock, was adjudged to possess superior merit to the rest, and that furnished by Mr. B. B. Taylor, Architect of Sheffield, obtained the second premium.

'Mr. Taylor has since been employed in the capacity of Architect by the Committee.'

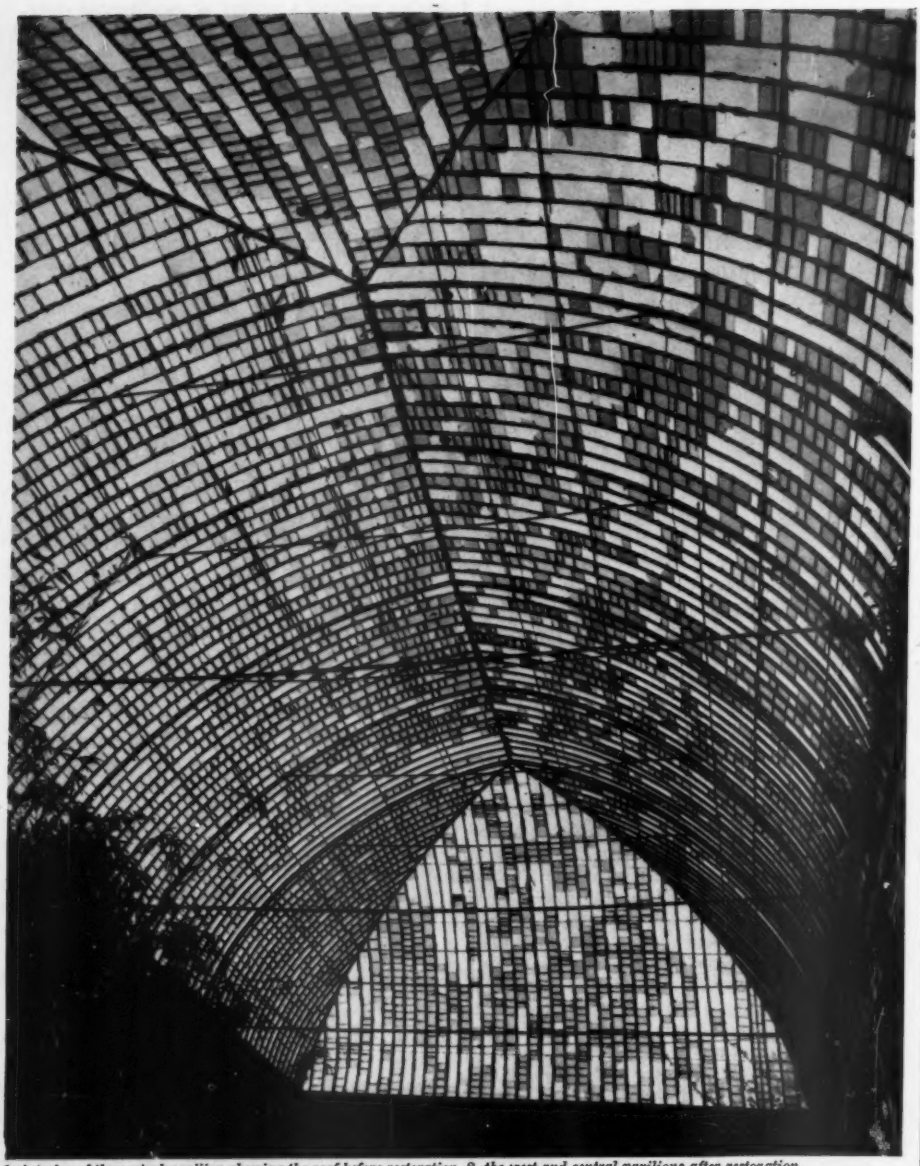
The Botanical Gardens Pavilions were certainly complete and in existence on June 29, 1836, for the official opening of the Botanical Gardens, and are mentioned in the contemporary press reports of this occasion, which adds that '*it was impossible to get the glazing completed for the opening*' (cf. *Sheffield Mercury*, July 2, 1836).

It would seem that the pavilions were built between 1834 and 1836. There is evidence in the records of the Society of vast sums of money expended by the two societies in that period, from 1834 to 1838. From the above dates it is impossible to determine whether Paxton's Chatsworth design influenced Taylor in Sheffield, or *vice versa*. Certainly Paxton, as a member of the Committee, had seen Taylor's glasshouse designs in 1834; three years before building his own glasshouse on this principle at Chatsworth.

The Sheffield Pavilions, however, do not resemble Paxton's Great Conservatory at Chatsworth to the extent that is believed. In Paxton's Chatsworth days, glasshouse work was very limited, and tender plants had to be raised in glasshouses which would now be regarded as gloomy buildings unsuited to their purpose. They were generally of the lean-to type with walls wholly or largely of brick. The roof timbers were thick and heavy, taking up nearly as much space as a pane of glass, and the result was extravagantly inefficient. The new principle replaced angular structures with curvilinear glazing or dome-shaped glazing. Loudon's curvilinear glazing used the 'ridge-and-furrow' system as early as 1818.

Mr. John Gloag, with whom I have discussed this point, reminds me among other helpful points that in 1827 Loudon described a glass dome, erected in that year for Mrs. Beaumont, of Bretton Hall, Yorkshire. (This description and an illustration of the dome are given on pages 980 and 981 of Loudon's *Encyclopædia of Cottage, Farm and Villa Architecture and Furniture*, 1833.) It is interesting to know that Robert Marnock, newly appointed and first Curator, of the Sheffield Botanical Gardens, was previously at Bretton and therefore was quite familiar with Loudon's glass dome principle of glasshouses.

The so-called 'Paxton Pavilions' in Sheffield derived the design of their main stone structure from the Belton House orangery attributed to Humphrey Repton (1752–1818) which, with its stone structure



1

2

1, interior of the central pavilion showing the roof before restoration. 2, the west and central pavilions after restoration.

and flat opaque roof, is typical of eighteenth-century orangeries. In Sheffield, the architect Taylor placed upon such a structure a rectangular dome with curved sides; supporting the glass on slim, metal ribs, in 1834–36. In 1837, Paxton, who had seen Taylor's design in 1834, built the Great Conservatory at Chatsworth, which was the square dome principle placed, not on top of an eighteenth-century style of orangery like Taylor's design in Sheffield, but directly on the ground without any stone structure beneath it.

The restoration of the pavilions, following bomb-damage which left them virtually without glass, was undertaken by the Sheffield Public Works Department and the rebuilding of the domes was entrusted to Messrs. Mellowes & Co., who re-roofed the north transept of the Crystal Palace *circa* 1902, and who built the roof of Olympia. Apart from the heavy hip members and a few stiffened ribs, the whole of the glass roofing is self-supporting, and the slender tie-rods between the continuous arched glazing-bars contribute little or nothing to the stability of the whole.

A new process in iron and steel was used to provide the iron for the new ribs for the glazing-bars. The old method of forming the section for the original ribs made 135 years ago is now obsolete. The west pavilion was the first of the three to be tackled; and as rolls for suitable wrought-iron sections were no longer available, it was decided to adopt what is still a relatively new development in this country—hot-extruded iron section for the glazing-bars which were in need of renewal.

Up to a point, this experiment was justified, but apart from the high cost, it was found that the section tended to vary from the original profile, thus adding to the difficulties of bending and fixing. A change was therefore made and the glazing-bars or ribs for the east and centre pavilions were extruded from a medium-strength, heat-treated aluminium alloy. The method of glazing followed in all cases the procedure adopted when the pavilions were originally built.

The panes were ordered to a standard size 9 in. by 6 in. Over 3,000 of these small panes were used on each of the east and west pavilions, and about 10,000 on the centre pavilion. The pavilions received new timber on the windows and doors, which are Georgian in character, and this closely followed the original design. The internal and external Georgian stucco surfaces and internal cornice moulds, and so on, have also been reinstated.

The Great Conservatory at Chatsworth was blown up and the Crystal Palace was burnt down, and these restored pavilions are among the few surviving early examples of this type of metal-and-glass building.

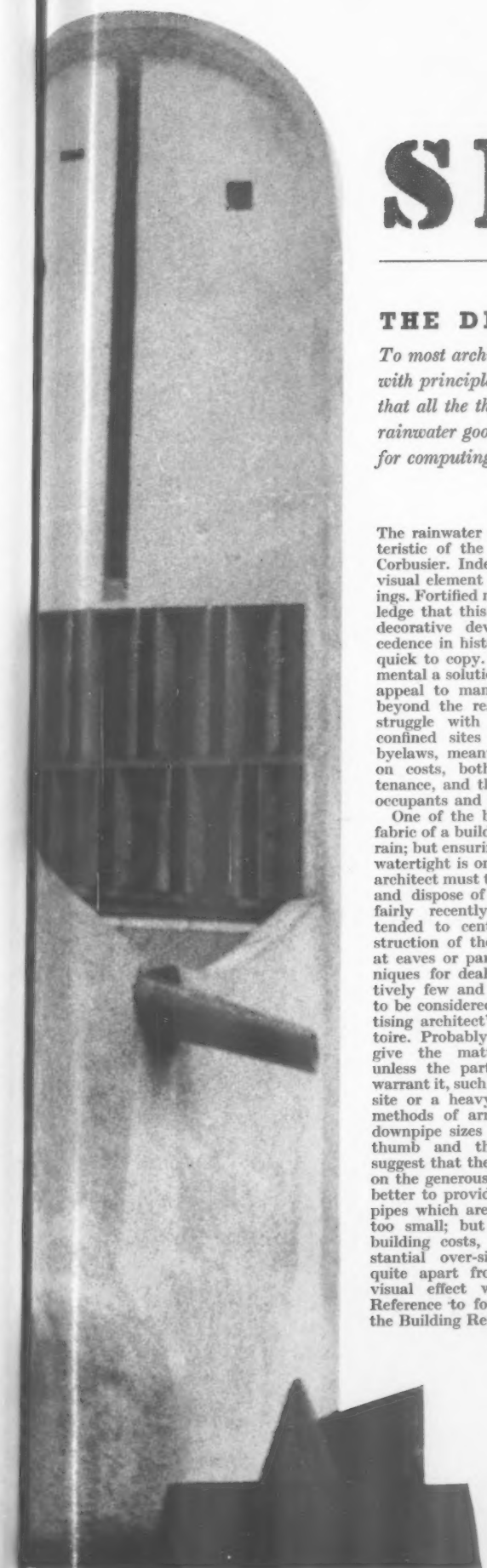
Richard Seddon

SKILL

THE DISPOSAL OF RAINWATER

G. C. A. Tanner

To most architects the arrangements for disposing of rainwater are made as a matter of course in accordance with principles and details which are wholly traditional. Several factors have emerged recently which suggest that all the thinking on this subject has not yet been done. These include the advent of new materials for rainwater goods, the increased use of impermeable wall claddings and the publication of more precise data for computing gutter and downpipe sizes.



1, *rainwater spout at Le Corbusier's Ronchamp chapel.*

The rainwater spout, 1, is a characteristic of the postwar work of Le Corbusier. Indeed, it is a significant visual element on most of his buildings. Fortified no doubt by the knowledge that this part functional, part decorative device has ample precedence in history, others have been quick to copy. But whilst so fundamental a solution to the problem will appeal to many, it is likely to be beyond the reach of most as they struggle with the complexities of confined sites and local authority byelaws, meanwhile keeping an eye on costs, both capital and maintenance, and the convenience of the occupants and users of the building.

One of the basic functions of the fabric of a building is to keep out the rain; but ensuring that the building is watertight is only the first task. The architect must then arrange to collect and dispose of the rainwater. Until fairly recently this problem has tended to centre around the construction of the roof and the finish at eaves or parapet. Accepted techniques for dealing with it are relatively few and sufficiently unvaried to be considered as part of the practising architect's construction repertoire. Probably he seldom stops to give the matter second thought unless the particular circumstances warrant it, such as an unduly exposed site or a heavy rainfall area. Most methods of arriving at gutter and downpipe sizes are based on rule of thumb and there is evidence to suggest that these rules too often err on the generous side. Obviously it is better to provide gutters and downpipes which are too big rather than too small; but in an age of high building costs, consistent and substantial over-sizing is undesirable quite apart from the detrimental, visual effect which often results. Reference to formulæ developed by the Building Research Station before designing the rainwater disposal system is well worth while.

The problems of rainwater run-off are no longer confined to the roof. The rapid development and use of materials impermeable to water in light cladding systems has revealed weaknesses in traditional detailing and created conditions where considerable trouble can arise as the result of a failure to take account of the rainwater which, unable to penetrate the wall, flows down it to the base or to its junction with a permeable wall covering.

Byelaws

It is common sense to make provision for rainwater, either by collecting and storing it or, as is far more usual, by disposing of it as quickly and effectively as possible. None the less, local authorities have power to ensure that adequate provision is made. Model Byelaw 81, for example, states: *The roof of a building shall be so constructed, or so provided with appliances for drainage, as to prevent rain or snow which may fall upon it from causing dampness in any part of the building or damage to the foundations.* The increased use of impermeable materials for cladding probably justifies the insertion of the word *wall* after *roof*. Byelaw 92 states: *No rainwater pipe or gutter shall discharge into or connect with any soil pipe, ventilating pipe to a drain or waste pipe used as a ventilating pipe to a drain.*

In designing the drainage system for a building it is necessary to ascertain from the local authority whether a combined system is acceptable or a separate one necessary, in which case one drain must be provided for soil and waste and a second for rainwater. The main reason for separating foul and rainwater in this way is to simplify the problem of sewage treatment. It also permits a more economical sizing of plant and sewer pipes as the average and peak flows of foul drainage are fairly constant, whereas the variation between the flow of rainwater during a storm and in normal times can be considerable.

British standards

British Standard Code of Practice CP 303 : 1952 *Surface Water and Subsoil Drainage* deals with methods of collecting and disposing of rainwater from roof and paved areas, but its provisions are not very illuminating. CP 301:1950 *Building Drainage* is, of course, the principal code and rainwater drainage is merely one part of it.

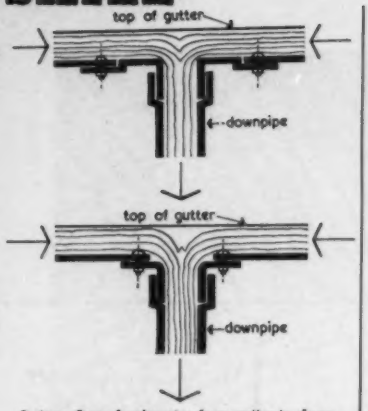
Several British Standards deal with rainwater goods and these are listed later under the heading 'Choice of Material.'

The roof

It is sometimes necessary to collect the rainwater which falls on to a roof and store it in tanks for the use of the occupants of the building. Rainwater is also used, on occasion, as thermal insulation. In this case the roof is constructed so that it becomes a huge, shallow tank in which water lies to a depth of several inches. For most architects concerned with buildings in this country, however, the task is merely one of getting rainwater off the roof and into the drains as quickly and simply as possible. It is not enough to put a slope to the roof surface and hope that the water will fall off. Even if no byelaws existed, it would still be necessary to make some provision to ensure that dampness or excessive weathering does not affect the wall and that water does not fall off to the discomfort of the occupants of the building and passers by.

The sizes of gutters and downpipes are usually arrived at empirically, often by reference to a note in a pocket diary. Such figures as exist in textbooks are aimed at establishing the *flow loqd*, which is the total quantity of water in gallons coming off the roof every minute. In November, 1958, BRS published Digest 116, *Roof Drainage*, which supplied data enabling a rational approach to the design of eaves gutters and downpipes, 2. In its introduction the Digest states that existing provisions for roof drainage based on accepted rules of thumb, whilst giving satisfactory results, are often over-generous when compared with the requirements found in an experimental study of the behaviour of gutters and downpipes.

As pointed out in the Digest only three features in the rainfall pattern influence roof drainage: average intensity of fall, its duration and frequency of occurrence. The Digest puts forward 3 in. per hour as the average intensity of rainfall for general design purposes for eaves guttering in the UK. This intensity occurs, in any given locality, over a period of five minutes, about every other year, and over a period of ten minutes, only once in eight years.



2, top: flow of rainwater from gutter to downpipe obstructed by sharp angles; bottom: unobstructed flow.

For roof pitches up to 50 deg., the actual roof surface may be taken as the basis for calculation, ignoring pitch and the angle at which rain falls. The flow load is thus computed from the formula

$$\text{flow load (in gallons per minute)} = \frac{2.6}{100} \times \text{actual area of roof in sq. ft.}$$

For roof pitches exceeding 50 deg., a more accurate formula is required: flow load = plan area $\times$ (0.026 + 0.012 tan A) where A is the angle of pitch.

Where the gutter is laid to a fall of not less than 1 in. in 50 ft., the flow load figure may be decreased by 28 per cent. The length of sloping gutter is limited, however, by the condition that the top of the gutter should not be more than 2 in. below the discharging edge of the roof. The least favourable position for a downpipe is at the end of the run of gutter. The above formulæ assume, in fact, that this condition will apply. When it is placed elsewhere, reductions may be allowed to the calculated flow load figure of up to 50 per cent (where the downpipe is in the middle of the run). The reduction is calculated as follows:

$$\text{percentage reduction} = \frac{A_1}{A} \times 100,$$

where A_1 = the larger of the two areas of roof on either side of the downpipe

A = total area of roof.

Bends also affect the flow load. The following allowances should be made:

Level gutters

Bend between 6 ft. and 12 ft. of outlet:
- sharp cornered, 10 per cent increase.
- bend rounded to 1 in. radius, 5 per cent increase.

Bend within 6 ft. of outlet:
- sharp cornered, 17 per cent increase.
- bend rounded to 1 in. radius, 10 per cent increase.

Sloping gutters

Bend between 6 ft. and 12 ft. of outlet:
- sharp or round cornered, 12½ per cent increase.

Bend within 6 ft. of outlet:
- sharp or round cornered, 20 per cent increase.

Final adjustment to the flow load will then enable gutter sizes to be determined from Table 1. This table applies only to half round gutters. The figures in columns 2 and 3 represent the flow capacity of the gutter in gallons per minute (i.e. the amount of flow load which the gutter will take). For gutters of a different cross section, the flow capacity must be calculated from the formula

$$Q \text{ (flow capacity)} = 1.15A^{\frac{5}{4}},$$

where A = area of cross section. This formula is only applicable where the ratio of gutter width to depth is 2 to 1.

The number of downpipes must be assumed and their positions determined. It is then possible to arrive at their size by reference to Table 2.

Table 1

Half-round gutters		
size (in.)	true half-round	nominal half-round
3	5·6	4·2
4	11	8·6
4½	15	11
5	20	14
6	31	24

Table 2

half-round gutter size (in.)	outlet: sharp cornered (SC) round cornered (RC)	outlet at end of gutter (in.)	outlet not situated at end of gutter (in.)
3	SC	2	2
	RC	2	2
4	SC	2½	2½
	RC	2	2
4½	SC	2½	3
	RC	2	2½
5	SC	3	3½
	RC	2½	3
6	SC	3½	4
	RC	3	4

The downpipe sizes given in this Table are less than those used traditionally. The downpipes, therefore, will tend to run full when rainfall is heavy and they must have sealed joints.

The wall

Basically there are three ways of preventing rainwater penetrating into a building through the walls:

(i) The use of walling materials which, though permeable to water, allow it to pass through so slowly that it will dry out before reaching the inner face.

(ii) The adoption between two skins of wall of a continuous cavity to break the capillary paths along which moisture travels.

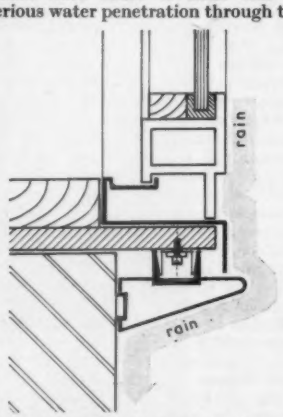
(iii) The encasing of the building within an impermeable envelope.

Method (i), of course, is the oldest tradition in building. These days it is not considered adequate in our climate for buildings more than two storeys high. Method (ii) does not go back so far in building history, but is common practice today, particularly in domestic construction. The possibilities of method (iii) have always fascinated architects and the development of light cladding systems has offered ample opportunity to explore them.

The application of an impermeable skin to a building immediately raises problems. The foremost of these is the not inconsiderable quantity of rainwater falling on the wall surface. In Digest 98 *Light Cladding—Part* 1, BRS suggest that in a heavy rainfall this can amount to one gallon a minute for each hundred square feet of wall exposed to rain. On, say, a six-storey building this means about 45 gallons of rainwater per hour reaching the base of each foot run of the façade.

It is a curious fact that the necessity to do something about collecting and disposing of such a quantity of water has never impressed itself as urgent upon manufacturers of light cladding systems. To some extent they can be excused for assuming, as no doubt they must do, that provided their cladding system is put together so that none of this water can penetrate it in its journey from top to bottom of the building, it is the architect's concern, not theirs, what happens to the water when it reaches the ground. Even BRS in their two excellent studies of the subject of light cladding* submit that 'there have not yet been any indications from practice that intermediate catchments between the roof and the ground are desirable. . .' They do suggest, on the other hand, that water should be so directed to run off away from doorways and paths. In a recent series of articles in *The Architects' Journal*, R. Michael Rostron went so far as to suggest that the rainwater which falls on the wall could be utilized to wash the areas of wall immediately under a projection which are not normally exposed to rainwater running down the face of the wall. To do this would mean abandoning traditional sill and projection drip profiles in favour of a detail such as that shown in 3. It is worth noting, however, that in putting forward such a suggestion Rostron is, none the less, a firm supporter of the view that provision should be made, at least at the base of the wall, for collecting rainwater. His views on the subject are supported by considerable research and an exhaustive survey of light cladding systems and their weaknesses. In actual practice no impermeable skin construction can expect to be 100 per cent watertight. This is asking too much of joints and junctions of materials. But, even if both architect and manufacturer are confident that there is little risk of serious water penetration through the wall, what of the water when it reaches the ground?

* Digests 98 and 99.



3, suggested profile based on a detail by A. M. Gear.

In most buildings using light cladding the question remains unanswered. There are exceptions. One of the most thorough-going and sophisticated of these is the new Peter Robinson store in the Strand, 4. In their detailing of the fabric of this building, the architects, Denys Lasdun and Partners, have shown a sensitive appreciation of the visual/technical problems of design. The result is a building which is not only visually satisfying but also weathertight and is weathering exactly where and how the architects intended. The upper three storeys are clad with

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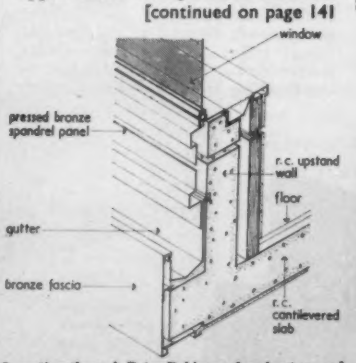


5, section through Peter Robinson façade at second floor level.

4, part of the façade of the new Peter Robinson store showing the gutters above each line of windows.

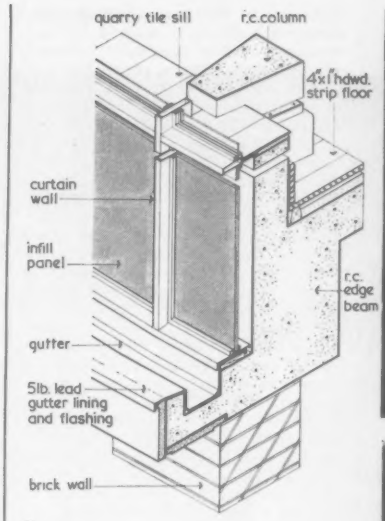
continued from page 140]

pressed bronze sections and at each floor level is a vitreous enamel cast iron gutter, 5, which collects rainwater and carries it to a number of vitreous enamel downpipes which run within the floor slab and down the first row of columns 7 ft. back from the façade. The facing to the solid wall at first floor level is reconstructed Portland stone.

The rainwater problem is intensified where the impermeable cladding does not go right down to ground level. If the cladding projects beyond the permeable wall covering immediately below, there is likely to be a cascade of water during a heavy rainfall aided and abetted by the traditional projection drip detail. If there is no projection, staining and even water penetration of the lower permeable material may result. In a factory and office block in London where the basement and ground floor are built in solid brickwork and the upper four floors clad with aluminium alloy framing with coloured glass infill, the architect, Justin H. Alleyn, has formed a continuous gutter or channel in a projection to the edge beam, 6, and this gutter discharges into a number of downpipes passing back behind the masonry wall at the lower level.

The secondary school at Catford, designed by the LCC Architect's Department, 7, and the factory at Blackpool, designed by Grenfell Baines and Hargreaves, 8, are two instances where provision has been made to collect the rainwater at ground level. The school at Catford has light cladding consisting of galvanized steel framing with laminated glass and wired cast glass infill for the whole of the classroom block. The base of the cladding finishes on an angle cleat secured to the plinth which is the edge of the ground floor slab. The floor of the rainwater channel is the top of the ground beam which rests on the structural stanchion plinth above the concrete base. The outer side of the channel is finished with a precast concrete kerb, the top of which is at ground level.

In the illustration of the factory at Blackpool, the base of the light cladding coincides with ground floor level and is several feet above ground level. The difference is made up with a reinforced concrete plinth wall. The cladding comprises galvanized m.s. framing with infill panels faced with laminated glass.



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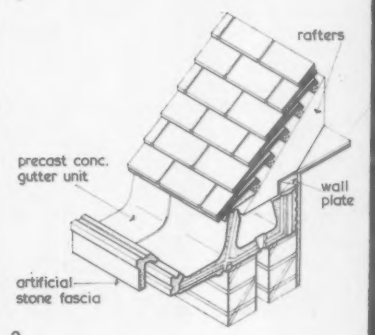

9

6, section through street façade of office and warehouse in Hopton Street. 7, gutter at base of wall, secondary school at Catford. 8, gutter at base of wall, factory at Blackpool. 9, Finlock precast concrete gutter unit.

Choice of materials

To the traditional materials used for rainwater goods, newcomers have been added from time to time. These include aluminium (since the war) and, more recently still, plastics. In an absolute sense no one material can be regarded as superior to others. Choice must be based on the particular circumstances peculiar to each project. Failure of certain metals due to corrosion, for example, is due not so much to a weakness inherent in the material itself, as to faulty detailing or a lack of understanding of its properties and characteristics. Nature and proximity of adjacent materials, methods of fixing, ease of maintenance, strength, weight, workability and cost will all exercise an influence from time to time. The following is a selection of the more common materials and their British Standard reference.

Cast Iron: BS 460 and 1205: 1948

Cast iron is manufactured in three classes of which grey cast iron is the most extensively used. It has the largest amount of graphite carbon and a small quantity of chemically combined carbon.

This material is amongst the most commonly used for rainwater goods. Despite the increasing popularity of newer materials, it is still one of the cheapest and most durable.

Aluminium: BS 2997:1958

The use of aluminium rainwater goods has only become widespread since the war. Downpipes are made from sheets or strips or else extruded in the form of seamless tubing. Gutters are made to standard designs (half round or ogee) from cast or extruded sections. They are also made from pressed metal either 14 s.w.g. minimum thickness (heavy grade) or 20 s.w.g. minimum thickness (light grade). In the latter case it is necessary to stiffen the edges by beading them.

The foremost advantage of aluminium is strength relative to weight. It is easy to handle and fit and to work on site with hand tools. Its resistance and that of certain of its alloys to simple atmospheric corrosion is high. Surface corrosion of unpainted fittings does occur, but there are no rust stains to cause discolouring of masonry as sometimes happens with other metals. When using aluminium rainwater goods, however, it is advisable to have the whole of the rainwater system in this material.

Copper: BS 1431:1948

Copper is highly ductile and malleable and has the advantage that on exposure to weather it develops a green patina which forms a protective film. It retains its physical properties almost indefinitely and does not require painting, an important consideration in assessing the maintenance costs on a building. First cost, however, is high compared, say, with cast iron. It should never be used in conjunction with aluminium, whether there is direct contact or where eventual contact will occur as with water passing from copper to aluminium.

Lead

Lead has the great advantage that it will not corrode, no painting and maintenance being necessary. It is easily worked and can be formed into any profile required. Its drawback is its lack of mechanical strength necessitating regular support.

Pressed Steel: BS 1091:1946

Pressed steel gutters are manufactured from black mild steel either in light or heavy sections. Light pressed steel gutters are made to standard sizes in two profiles, half round and ogee. Its disadvantage is that it corrodes easily. Heavy pressed steel gutters are not made to standard profiles and are very suitable for industrial buildings where they can be specially made to suit each location. Under these circumstances they have the advantage over cast iron, being lighter, stronger and cheaper.

Zinc: BS 1431:1948

Zinc is manufactured from several ores. Rainwater goods are produced from rolled sheet zinc in three standard profiles—half round, ogee and rectangular. Downpipes are made in either round or rectangular sections. The protective film formed on exposure to the atmosphere does not give sufficient protection to prevent a slow attack on the metal with the result that its life is generally less than that of other metals. It should not be used in conjunction with copper as it is subject to electrolytic action. It has the advantage of being comparatively cheap and is used extensively on the Continent. In fact, it is difficult to know why it is not more commonly used here.

Vitreous Enamel

Vitreous enamel rainwater goods are made with acid resisting leadless enamel fired on to the iron in several coats. They have the great advantage that, whilst the enamel remains undamaged, no corrosion can occur. In first costs they compare favourably with cast iron painted three coats. The manufacturers claim that they are highly shatter-proof.

Plastics

Needless to say plastics have entered this field. Polyvinylchloride is used for gutters, downpipes and brackets, and polyester glass fibre for gutters and rainwater heads. The tendency amongst manufacturers (a highly commendable one) is to mould the fittings in the simplest possible forms. One firm produces fittings in which the gutter is sprung into the gutter brackets. This material has the advantage of being self-coloured and, of course, not subject to corrosion. It is too soon to know for certain the life of the material or how it will behave as it ages, but present indications are that, as in other fields, it has a bright future.

Asbestos Cement: BS 569:1956

This material is produced in standard sections for both gutters and downpipes. Its advantages are lightness of weight, relatively low first cost and that virtue common to all non-metal materials—incorrodibility. Its chief disadvantage is that it is a comparatively fragile material likely to become more brittle with age.

Precast Concrete: BS 2908:1957

Standard precast concrete eaves gutter units, 9, are manufactured in accordance with the appropriate British Standard. Unless the manufacturer advises otherwise, a non-ferrous metal lining should be provided. Joints in units should be discontinuous and filled with mastic

SKILL

or a similar mortar. The advantages of this material are durability, strength and permanence. As against this is its weight (handling on small jobs can be a problem). It can be argued that precast concrete is a stronger material than is necessary for the purpose solely of carrying off rainwater. In domestic construction where the precast unit is fully supported on the wall, this would certainly be true. Manufacturers should lay greater stress on the potential within this material for serving a dual function. There is a future for a standard unit which is structural as well as being the means of rainwater disposal.

Conclusions

With one or two notable exceptions the modern architect does not regard those elements of his building which cope with the disposal of rainwater as being worthy of prominent visual treatment. It is more usual to devise ways and means of neatly concealing them. The concept of structural expression does not seem to have a parallel with the services. The result is that gutters, outlets, rainwater heads and downpipes are often not only invisible but also hard to get at. There is nothing wrong with this. The shape and necessary profusion of these elements make them very difficult to resolve visually in a satisfactory way. Many an otherwise well-designed building is marred by bad detailing of the rainwater disposal arrangements. But in concealing the gutters and downpipes it is essential to observe a simple rule. Materials must be chosen which are durable and require little or no maintenance. It is no good carefully concealing a gutter when, in five years time, half the building has to be torn down to get at it for painting or replacement. Manufacturers could do a great deal more to assist the architect in this problem. Research should take the course of evolving designs of standard sections suitable for building into concealed positions. One quite fruitful line of research should be the idea of combining the gutter with the structural member. A very workmanlike example of this is the combined eaves gutter and edge beam at the new buildings for undergraduates at St. John's College, Oxford, 11, designed by Architects' Co-Partnership. Concrete manufacturers appear to have a head start in this field and really ought to take the hint. Rainwater disposal is one element of the building in which it is probably better to accept higher first costs in going for materials which require little maintenance.

Another direction in which neither manufacturers nor British Standards have been particularly helpful is in the range of standard profiles offered. For example, cast iron and pressed steel are manufactured in half-round and ogee only and the asbestos cement standard covers rectangular sections for box gutters only. A square or rectangular profile viewed within the context of the building as a whole is visually much more satisfactory. It is argued that a half-round profile is the most efficient water channel and that an ogee profile is structurally strong. But the advantages in efficiency and strength over the rectangular section really are marginal in most instances.

The development and increasing use of plastics and vitreous enamel in rainwater goods has meant that the architect can now get reliable self-coloured materials. It would be encouraging if manufacturers wholeheartedly followed the BRS standard range of colours. The use of a self-coloured material should be treated with some caution in the choice of colours. By definition the colour, being within the material, can never be changed. Blacks, greys and whites are safe enough but it is not easy to select any other colour and be sure of not tiring of it in the course of time.

10

11

10, section through wall and roof and, 11, close-up of elevation, new undergraduates building, St. John's College, Oxford.

THE INDUSTRY

Floor warming brochure

It is surprising how often trade literature aimed at the architect fails to supply him with relevant information. This is inexcusable when it is intended for the very man who needs technical facts and not just the bland assurance that the product will last a lifetime. It is encouraging, therefore, to see a new brochure on electric floor warming which sets out to be informative. This one, produced by R. B. Pullin & Co. Ltd., concerns itself with the principles of electric floor warming and, although it covers almost the same ground as the EDA publication recently reviewed in these columns is, in consequence, no less useful. Architects (for whom it was specially written) will be well served by it. If this brochure is well received, it is intended to be the first of a series.

Notwithstanding the above, it is time the electrical industry took its courage in both hands and commissioned an independent expert to prepare an unbiased, comprehensive textbook on the subject. Such a book is long overdue.

R. B. Pullin & Co. Ltd., Thermostat Division, Phœnix Works, Great West Road, Brentford, Middlesex.

Wood laminates

Belfort wood laminate is a thin laminate in which the facing is a hardwood veneer impregnated with melamine to give it a transparent, durable finish. The core is a phenolic plastic and the backing a roughened Gaboon veneer to facilitate bonding with standard adhesives. Belfortboard is a similar product (5/32 in. thick) except that hardboard is used in place of the plastic core. Until recently Belfort wood laminate was available only in figured mahogany, figured limba, sapele, makore and afrormosia. Now it can be obtained in almost any timber as a special order. Recent orders have included figured Indian laurel, teak, white and olive ash, Bombay rosewood, Australian walnut and zebrano. The manufacturers point out that non-standard woods are only made in a minimum quantity of twenty-four sheets, but the architect may inspect the veneer before the sheets are laminated.

Standard Belfort wood laminate is made in 8 ft. by 4 ft. by $\frac{1}{16}$ in. thick panels and costs between 2s. 9d. and 3s. 6d. per sq. ft. ex works depending on quantity. Afrormosia and figured mahogany cost 2d. per sq. ft. extra and figured limba 4d. extra. Belfortboard costs 8d. per sq. ft. more than Belfort.

Bonded Laminates Ltd., CHN Veneer Mills, Chisenhale Road, London, E.3.

Structural steel brochures

The British Constructional Steelwork Association has recently revised and re-issued two of its brochures. The first of these is entitled *Examples of Structural Steel Design* originally prepared by V. H. Lawton and revised in this edition by Lewis E. Kent and E. G. Lovejoy. As its name implies it comprises examples of structural design of riveted and bolted assemblies to conform with the requirements of BS 449:1959. Although it is concerned with the simpler structures and fundamental design problems (it describes the design of a three-bay 150 ft. square single-storey factory clad in asbestos and glass), it is probably of greater interest to the engineer than to the architect, though the latter may find it a useful reference on occasion.

Much the same can be said of the second brochure *The Use of Welding in Steel Building Structures*, revised by G. Bernard Godfrey. The original format and opinions of the earlier editors (1952 and 1957) remain unaltered, but text and illustrations

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have been revised in conformity with BS 449:1959.

Both brochures are available from the BCSA at 3s. 6d. each. Schools of architecture might well consider using them as textbooks for 2nd and 3rd year structures. It is to be hoped that when next these brochures are revised a real effort will be made to infuse into them a decent standard of typographical and layout design.

British Constructional Steelwork Association, Artillery House, Westminster, London, S.W.1.

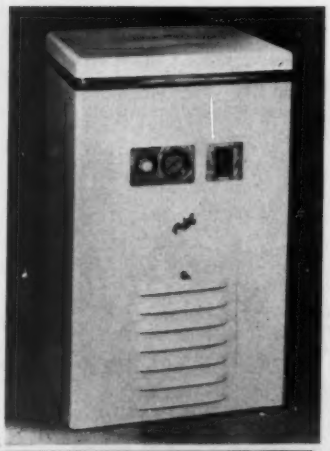
Gas fired boiler

Because of the rapidly spreading interest in the idea of whole house heating since the war, domestic boiler design has undergone a considerable revolution not only in its technical aspects but also in its visual. Even so refinements in design have not come as quickly or probably as far as they should by now, and it is worth remarking the advent of any new design which is obviously competent.

The gas fired boiler, 1, 2, is one of a new range by Perkins Boilers Ltd. Known as the 'Paramount,' it has been fully tested by the Gas Council and has an output of 50,000 B.t.u.'s per hour. It is understood that models with 75,000 and 100,000 B.t.u.'s rating, respectively, are available but have not yet been tested by the Gas Council. The boiler is constructed of high quality boiler steel and has a detachable cover fitted over the top to enable access to the whole of the combustion area for cleaning. The boiler and controls are encased in a white stove enamelled sheet steel casing, the whole of which can be removed quickly for access to the whole unit. Points of criticism of the design of this casing are the stainless steel strip at the top which, however necessary, is a ham-handed example of detailing, and the surrounds to the control points. Why are there two separate plates here and is this the best the designers could think of in the way of fixing and finish? Another criticism which, in all fairness, is by no means confined to this company, is the crude nameplate fixed to the front of the casing. If householders are forced to accept this permanent form of advertising on products they buy for use in the home, they are at least entitled to a reasonable standard of visual design.

Retail price of the 'Paramount' boiler is £99 complete with small bore circulator, electric switch, temperature gauge and time clock. Without these the price is £54.

Perkins Boilers Ltd., Mansfield Road, Derby.



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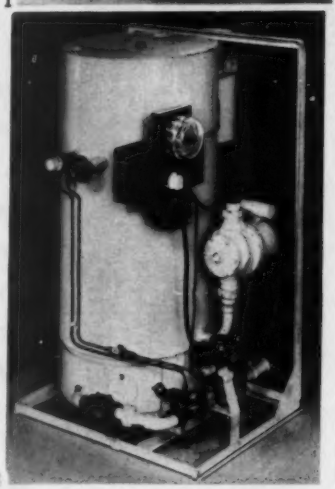

2

1, 'Paramount' gas fired boiler; 2, with outer casing removed.

Adjustable roof ventilator

Colts have produced a new roof ventilator, the O/SR, similar to the SR ventilator, but differing in that it may be adjusted by cord control to three positions—closed, fully open and one intermediate position. For normal extraction the top cover flaps rest on stops, 3, giving complete weathering as in the SR ventilator. A pull of the control cord lifts the flaps of the top cover into a vertical position, giving the ventilator a clear opening which increased the ventilator's extract capacity by 50 per cent. When the flaps are dropped to the closed position the ventilator is completely sealed. The manufacturers claim that the use of the new ventilator can substantially reduce the cost of a ventilation scheme. Fewer ventilators are required because the installation can be designed for average conditions whilst, at the same time, there is extra capacity to deal with hot summer conditions by simply opening the flaps to a vertical position.

Colt Ventilation Limited, Surbiton, Surrey.

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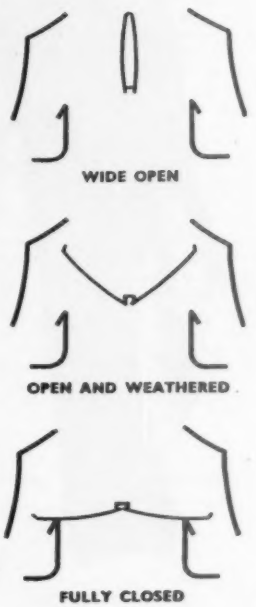

3, diagrammatic cross section of the new Colt ventilator showing three adjustable positions.

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5

4, drilling through outer leaf of cavity wall. 5, pressure injecting Thermalon.

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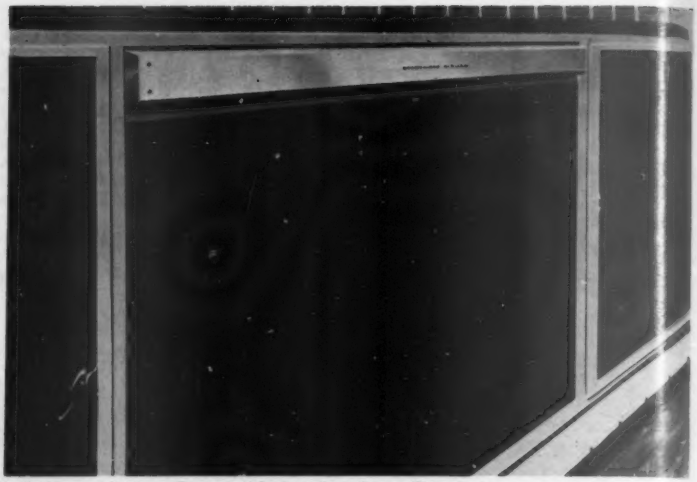
Thermal insulation

The provision of adequate thermal insulation is becoming more readily accepted and goes hand-in-hand with improved standards of heating. It is now possible, for example, to 'inject' a thermal barrier between the skins of a cavity wall in an existing house, 4, 5. The material which can be so injected is a carbamide in the form of a rapidly setting foam and has the trade name, Thermalon. The cost, supplied and fixed in a 2 in. cavity, is about 6d. per sq. ft., which for a house of, say, 1,200 sq. ft. of external wall area is £30.

Thermalon, which weighs approximately ½ lb. per cu ft., has a k value of 0.21, which means that an 11 in. cavity wall with an inner skin of insulating blocks would have a U value of between 0.07 and 0.1. Thermalon, of course, is equally suited to roof or ceiling insulation and, as an alternative to being pressure injected, can be applied in the form of prefabricated rigid blocks. *Thermalon Ltd., 213/223, Lewisham Way, London, S.E.4.*

4



6, the Greenwood Airvac 'Permavent' horizontal window ventilator.

Window ventilator

Permanent ventilators in windows are deceptively difficult things to design to satisfy the three basic requirements (i) adequate ventilation, (ii) weatherproofness, (iii) visual neatness. In the long run the simpler the ventilator in appearance the better, and it is for this reason that so many architects design their own by incorporating slots or grooves in the window frame. In metal windows, of course, this is generally not possible and a standard unit must be used.

The new 'Permavent,' 6, is purpose made in extruded aluminium in any required length up to 6 ft. Longer lengths can be made up to special requirements. The ventilator comprises the Mark I (permanent ventilation) and the Mark II (controlled ventilation) units made by the same company and can be supplied with or without flyscreens. The Mark II unit has a variable damper control operated by nylon cord supplied to a standard drop length of 2 ft. 6 in. unless otherwise specified. Fixing is by means of four $\frac{3}{16}$ in. screws, the ventilator being bedded in mastic and secured to the window frame before glazing. The glass should be bedded in mastic in the glazing channel of the ventilator, the whole unit being fitted in the usual way and the mastic carried round both ends and top flanges of the ventilator. *Greenwoods & Airvac Ventilating Co. Ltd., Beacon House, Kingsway, London, W.C.2.*

Fluorescent table lamp

The table lamp, 7, is a Swedish

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design called the Cebe II which has recently been imported into this country. It uses two 18 in. by 1 in. diameter fluorescent tubes, rated at 15 watts each. The advantage of using a fluorescent source for this purpose is that you get the equivalent amount of light to that given by a 100 watt tungsten bulb and a much better spread of light on the desk, but without heat. Since the light source of a desk lamp is near head level and only a foot or two distant, the question of heat is decisive. This Swedish lamp is fully counter-balanced, well finished (in grey enamel and chromium) and relatively cheap: £8 17s. 6d. with no purchase tax payable.

M. J. Glover & Co. (London) Ltd., 8, Evelyn Grove, Ealing, London, W.5.

7, the Cebe II Swedish table lamp.

CONTRACTORS etc

Church in Sheffield. *Architects:* Basil Spence & Partners. *General contractor:* Charles R. Price. *Sub-contractors: Heating:* Maddock & Wright Ltd. *Electrical:* Winstanley & Lambert Ltd. *Copper roof:* Grocock and Day Ltd. *Floor-laying:* F. Morley. *Planting:* G. W. Bradshaw & Son. *Nave furniture:* Rowland Bros. Ltd. *Chancel furniture:* Harris & Moulder Ltd. *Plastering:* H. F. Breame. *Painting:* J. Ibbotson Ltd. *Bell:* John Taylor & Co. *Organ:* John Compton Organ Co. *Ironmongery:* Parker, Winder & Achurch Ltd. *Laminated timber beams and cross:* Kingston (Architectural Craftsman Ltd.). *Altar furniture:* Coventry Silvercraft Ltd. *Pavior bricks:* Haunchwood Brick & Tile Co. *Facing bricks:* Williamson Cliffe Ltd. *Stage curtains:* Conran Fabrics Ltd. *Derbydene font:* Nine Elms Stone Masonry Works. *Copper lights:* Frederick Braby Ltd. *Hall lights:* Frederick Thomas Ltd.

Houses, Swindon. *Architects:* Powell and Moya. *General contractors:* W. E. Chivers & Sons Ltd. *Sub-contractors: Heating and water services:* North Wilts Sanitary & Heating Co. *Built-up felt roofing:* William Briggs & Sons Ltd. *Kitchen fittings:* Walter Lawrence & Son Ltd. *Sanitary fittings:* Broad & Co. *Ironmongery:* B. Finch & Co.; Alfred G. Roberts (Exports) Ltd.

Flats, Coventry. *Architect:* Arthur Ling (City Architect). *General contractors: Lift installation:* The Otis Elevator Co. *Heating and ventilation:* Bernard Hastie & Co. *Roller shutter:* Roller Shutters Ltd. *Refuse hoppers:* Code Designs Ltd. *Slab reinforcement:* GKN Reinforcements Ltd. *Sliding windows:* Leyland & Sons Ltd. *Internal fire escape ladders:* Loft Ladders Ltd. *Bricks/partition blocks:* London Brick Co. *Doors:* Gliksten Doors Ltd. *Bricks (retaining walls):* Charity Banks Brickworks. *Glazing:* Aygee Ltd. *Decorative tiling:* Carter & Co. (London) Ltd. *'Eternit' surrounds:* G. R. Speaker Ltd. *Prodor-glaze:* Prodorite Ltd. *Tiled flooring:* Marley Tile Co. *Precast concrete claddings:* Croft Granite Brick & Tile Co. *Joinery:* E. O. Shanks Ltd. *Steel balustrading:* A. E. Shaw Ltd. *Terrazzo flooring:* The Coventry Tile Co. *Paint:* Docker Bros. Ltd.

Factory, Haverhill, Suffolk. *Architect:* Hubert Bennett (Architect to the London County Council). *General contractors:* Kerridge (Cambridge) Ltd. *Sub-contractors: Floor tiling:* Marley Tile Co. *Ironmongery:* Lockerbie and Wilkinson. *Rolling shutter door:* Dennison, Kett & Co. *Roof covering:* F. McNeill & Co. *Sliding doors:* P. C. Henderson Ltd. *Trusses and roof:* Woodworth Joinery Ltd.